

# DIVERSIFIED METAL FABRICATORS, INC.



## Parts & Service Manual RW-1630 & RW-1630/50\*



March 2015

SERIAL NUMBER (FRONT) \_\_\_\_\_

SERIAL NUMBER (REAR) \_\_\_\_\_

### NOTE:

Please refer to the serial numbers when ordering parts or  
inquiring about warranty items.

\* This manual applies to both DMF's RW-1630 Railgear, and DMF's higher capacity  
RW-1630/50 Railgear, including all configurations (standard, behind cab, and under cab)

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## Message from DMF

No matter what your job function is, Operation, Installation, Maintenance, or Repair, it is your responsibility to familiarize yourself with the entire manual. Once you have read the entire manual, there are some specific sections that you will want to pay special attention to, depending on your role.

For purposes of this manual, we will refer to RW-1630 when discussing either RW-1630 or RW1630/50, and we will explicitly call out any differences when appropriate.

If you find anything missing, incorrect or unclear in this manual, please contact us. We are always trying to improve our manuals.

Manuals, service bulletins and general information are available on our website listed below.

We reserve the right to update our manuals without notice. You can download a current manual at our website (<http://www.dmfatlanta.com>).

Thank you for choosing DMF Railgear. We make every effort to provide quality, safe and rugged products for the railroad. We hope you'll find our gear to be satisfactory in every way. We take product support very seriously, so if you have any questions, please contact us.

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# TABLE OF CONTENTS

<b>SECTION 1.0</b>	<b>GENERAL INFORMATION</b>	
	1.1 General Description .....	1-2
	1.2 Front Railgear .....	1-3
	1.3 Rear Railgear .....	1-5
<b>SECTION 2.0</b>	<b>OPERATIONS</b>	
	2.1 Before You Operate the Railgear .....	2-2
	2.2 Anti-Lock Brake System (ABS) .....	2-3
	2.3 Highway Operation .....	2-4
	2.4 Getting on the Rail .....	2-4
	2.5 Getting off the Rail .....	2-5
<b>SECTION 3.0</b>	<b>ROUTINE MAINTENANCE</b>	
	3.1 Inspection and Maintenance .....	3-2
	3.2 Lubrication Specification .....	3-3
	3.3 Troubleshooting .....	3-5
	3.4 Derailment .....	3-6
<b>SECTION 4.0</b>	<b>RAILGEAR INSTALLATION</b>	
	4.1 Pre-Install .....	4-3
	4.2 Initial Instructions .....	4-5
	4.3 Installation of Rear Railgear .....	4-7
	4.4 Varying Front Railgear Configurations .....	4-13
	4.5 Traditional Long Arm Assembly Installation .....	4-14
	4.6 Cargo Arm Front Assembly Installations .....	4-21
	4.7 Completing Front Installation .....	4-23
	4.8 Under Cab Front Unit Installation .....	4-26
	4.9 Behind Cab Front Unit Installation .....	4-30
	4.10 Overall Alignment Procedure .....	4-32
	4.11 Rail Test .....	4-34
	4.12 Final Weld-Out .....	4-34
	4.13 Install Decals .....	4-36
	4.14 Velcro Steering Wheel Lock .....	4-38
	4.15 Installation Review Checklist .....	4-39
<b>SECTION 5.0</b>	<b>RAILGEAR OPTIONS</b>	
	5.1 Rail Sweeps .....	5-2
	5.2 Pin-Off Options .....	5-3
	5.3 Brakes .....	5-7
	5.4 Two-Piece Wheels .....	5-14
<b>SECTION 6.0</b>	<b>HYDRAULIC SYSTEM</b>	
	6.1 Hydraulic System .....	6-2
	6.2 Valve Assemblies and Hydraulic Schematic .....	6-4
	6.3 RW-1630/50 Driver Side Rear Locking Valve Cylinder Assembly .....	6-5
	6.4 RW-1630/50 Passenger Side Rear Locking Valve Cylinder Assembly .....	6-6
	6.5 RW-1630 Rear Locking Valve Cylinder – Extra Short Links .....	6-7
	6.6 RW-1630 Front Hydraulic Cylinder Assembly .....	6-8
	6.7 Cylinder Assembly Procedures .....	6-9

6.8 JIC Fitting Installation.....	6-10
6.9 O-Ring Fitting Installation .....	6-11
6.10 Pipe Fitting Installation .....	6-12

## **SECTION 7.0 REAR RAILGEAR PARTS**

7.1 Before Ordering Parts – Rear Railgear .....	7-2
7.2 Rear Parts Detail Drawing .....	7-4
7.3 RW-1630 Pin-Off Orientation .....	7-5
7.4 Link Dimensions .....	7-6
7.5 Extra-Short Links .....	7-7
7.6 Short Links .....	7-8
7.7 Long Links .....	7-9
7.8 RW-1630 Wheel & Rear Axle Assembly (Detail) .....	7-10
7.9 RW-1630 Stub Axle Assembly, Rear, Double Insulated.....	7-11
7.10 RW-1650 Wheel & Rear Axle Assembly (Detail) ....	7-12
7.11 RW-1650 Stub Axle Assembly, Rear, Double Insulated .....	7-13
7.12 Rear Mounting Bracket – 12" .....	7-14
7.13 Rear Mounting Bracket – 10-3/4" .....	7-15

## **SECTION 8.0 FRONT RAILGEAR PARTS**

8.1 Before Ordering Parts – Front Railgear .....	8-2
8.2 Front Parts Detail Drawing.....	8-3
8.3 Long Arm Variations .....	8-4
8.4 RW-1630 Wheel & Front Axle Assembly.....	8-5
8.5 RW-1630 Stub Axle Assembly, Front, Double Insulated .....	8-6
8.6 RW-1630 Under Cab Front Railgear Assembly .....	8-7
8.7 RW-1650 Behind Cab Front Railgear Assembly .....	8-8
8.8 RW-1630 Mounting Tube Variations .....	8-9
8.9 RW-1630 Spring Hanger Variations.....	8-10

# LIST OF FIGURES/TABLES

Figure 1.2.1	Front Railgear Components .....	1-3
Figure 1.3.1	Rear Railgear Components .....	1-5
Figure 3.2	Railgear Grease Locations .....	3-4
Figure 4.1.4	Bolt Torque Specifications .....	4-4
Figure 4.2.4	Installation Rails .....	4-6
Figure 4.3.2	Diagram of Key Rear Components .....	4-8
Figure 4.3.4	Location and Clearance of Rear Railgear .....	4-9
Figure 4.3.7	Squaring Rear Railgear .....	4-11
Figure 4.3.9	Rear Mounting Plate Installation .....	4-12
Figure 4.3.10	Tack Welding of Rear Spacer .....	4-12
Figure 4.5.2	Diagram of Key Front Components .....	4-14
Figure 4.5.3	Bolted Joint Cross Section .....	4-15
Figure 4.5.4.A	Below Frame Rail Bridge Kit .....	4-16
Figure 4.5.4.B	Between Frame Rail Bridge Kit .....	4-17
Figure 4.5.5	Front Railgear Mounting Dimensions .....	4-18
Figure 4.5.7	Front Railgear Clearance .....	4-20
Figure 4.6.2	Diagram of Key Cargo Arm Components & Front Mounting Dimensions .....	4-21
Figure 4.7.1.A	Recommended Tack Location for Standard Front Axle .....	4-24
Figure 4.7.1.B	Recommended Tack Location for Front Stub Axle .....	4-25
Figure 4.8.6	Remote Air Pin-Off Installation – Under Cab .....	4-29
Figure 4.9.3	Behind Cab Installation Height .....	4-31
Figure 4.10.1	Overall Alignment Procedure and Final Weight Adjustment .....	4-33
Figure 4.12.A	Standard Front Railgear Final Weld-out .....	4-34
Figure 4.12.B	Front Stub Axle Final Weld-out .....	4-35
Figure 4.12.C	Rear Mounting Plate Weld-off .....	4-35
Figure 4.12.D	Rear Spacer Welding .....	4-36
Figure 4.13	Install Decals .....	4-37
Figure 5.1.A	Rail Sweeps .....	5-2
Figure 5.1.B	Rail Sweep Position .....	5-2
Figure 5.2.A	Manual Pin-Off .....	5-4
Figure 5.2.B	Front Remote Pin-Off .....	5-5
Figure 5.2.C	Rear Remote Pin-Off .....	5-6
Figure 5.3.1	Cobra Air Brake Location .....	5-7
Figure 5.3.2	Front Air Brake Installation .....	5-8
Figure 5.3.3	Rear Air Brake Installation .....	5-8
Figure 5.3.5.A	Cobra Air Brake Control System Assembly .....	5-10
Figure 5.3.5.B	Air Brake Control Kit for Behind Cab .....	5-11
Figure 5.3.6	Brake Inspection and Alignment .....	5-12
Figure 5.3.8	Cobra Air Brake Assembly .....	5-13
Figure 5.4	RW-1630/50 Insulated 2-Pc. Wheel Assembly .....	5-15
Table 3.1.1	Troubleshooting On-Track Problems .....	3-5
Table 4.1.5	Manufacturer Equivalent Welding Rod .....	4-5
Table 4.3.3	Location of Rear Railgear .....	4-9
Table 4.3.5	Shimming Chart .....	4-10
Table 4.8.1.A	Cylindrical Tank Spacing – Under Cab .....	4-26
Table 4.8.1.B	Squared Tank Spacing – Under Cab .....	4-26

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# SECTION 1.0    GENERAL INFORMATION

- 1.1    GENERAL DESCRIPTION ..... 1-2**
- 1.2    FRONT RAILGEAR ..... 1-3**
  - 1.2.1   Standard Front Railgear Components ..... 1-3
  - 1.2.2   Behind Cab Front Railgear Components ..... 1-4
  - 1.2.3   Under Cab Front Railgear Components ..... 1-4
- 1.3    REAR RAILGEAR ..... 1-5**
  - 1.3.1   Rear Railgear Components (Including RW-1630 and RW-1650) ..... 1-5

## 1.1 GENERAL DESCRIPTION

DMF's RW-1630 Railgear is our original and very successful Railgear for large trucks. The front guide wheel assembly attaches to the frame and front axle and lifts the front truck tires off the track, thus utilizing the vehicle's front suspension. This design supports the vehicle as it was intended and helps the truck navigate curves smoothly and damps out the effects of track irregularities. The rear assembly attaches directly to the truck frame behind the rear axle/tandem spring hangers. It deploys with an articulating dual scissor action that allows the rear Railgear to be moved both vertically and horizontally. This mechanism provides the "side shift" action which has made DMF gear so well known in the industry. It gives operators a greater margin for aligning the vehicle to the track, which speeds and simplifies the process of getting the vehicle on rail.

DMF RW-1630 Railgear is designed for vehicles with GVWR's 33,000 lbs and above. For greater capacity you can upgrade to our RW-1650 rear gear. It can boost your Railgear weight capacity by supplying a larger axle, bigger bearings, and special hardened rail wheels. The front Railgear and all other components remain the same as standard RW-1630. In addition to the high-capacity axle upgrade available with our RW-1650 Railgear, we also offer additional options for extreme conditions or tight curvature situations. See Sections 1.2 and 1.3 for specific configuration information.

For purposes of this manual, we will refer to RW-1630 when discussing either RW-1630 or RW1630/50, and we will explicitly call out any differences when appropriate.

### Materials:

All structural members and brackets are constructed of carbon steel. The 16" guide wheels for DMF RW-1630 Railgear are machined from hardened steel castings and are fitted to high strength alloy steel axles with heavy-duty tapered roller bearings.

### Installation:

Both DMF front and rear guide wheel units bolt to the truck frame using only hand tools found in any shop. They are designed to minimize the amount of space required and in many cases fit within the existing boundaries of the vehicle. The front units, however, sometimes require a bolt-on frame extension to complete the installation. Rear RW-1630 Railgear mounts below the top of frame and directly behind the rear axle spring hangers.

### Brakes:

#### **NOTE:**

The rail wheel brake system is intended to assist the existing vehicle brakes when in the rail mode. As the vehicle rear tires are in contact with the railhead, the primary braking effort is derived from the rubber tires. Rail wheel brakes alone are insufficient to stop the vehicle in a reasonable distance.

The optional RW-1630 rail brakes are of the air actuated external Cobra shoe type. The rail brakes use a truck style air chamber to supply the clamping force. Supply pressure comes from the vehicle's air system. A pressure protection valve separates the Railgear and the truck's air systems, preventing a failure in the rail brake system from adversely affecting truck braking. The rail brakes are applied simultaneously with the truck brakes when the operator presses the brake pedal. There is also a dashboard-mounted switch that permits the operator to enable or disable the rail braking system.

### Options:

There are several options available for RW-1630 Railgear. The most commonly ordered options include rail wheel brakes for improved stopping on rail, insulated wheels to prevent crossing signal actuation, rail sweeps to clear the rail of potentially damaging materials, and remote pin-



offs for ease of operation. Other less common options are non-standard track gauges, slotted links for improved hi-rail performance at crossings, and two-piece wheels for extreme conditions.

## 1.2 FRONT RAILGEAR

DMF's Heavy Duty Front Railgear is available in 3 different variations. The standard front Railgear uses a 1630 axle (see section 1.2.1), the Behind Cab variation uses an extra heavy duty 1650 axle and wheels (see section 1.2.2), and the Under Cab variation uses the 1630 axle (see section 1.2.3).

### 1.2.1 Standard Front Railgear Components

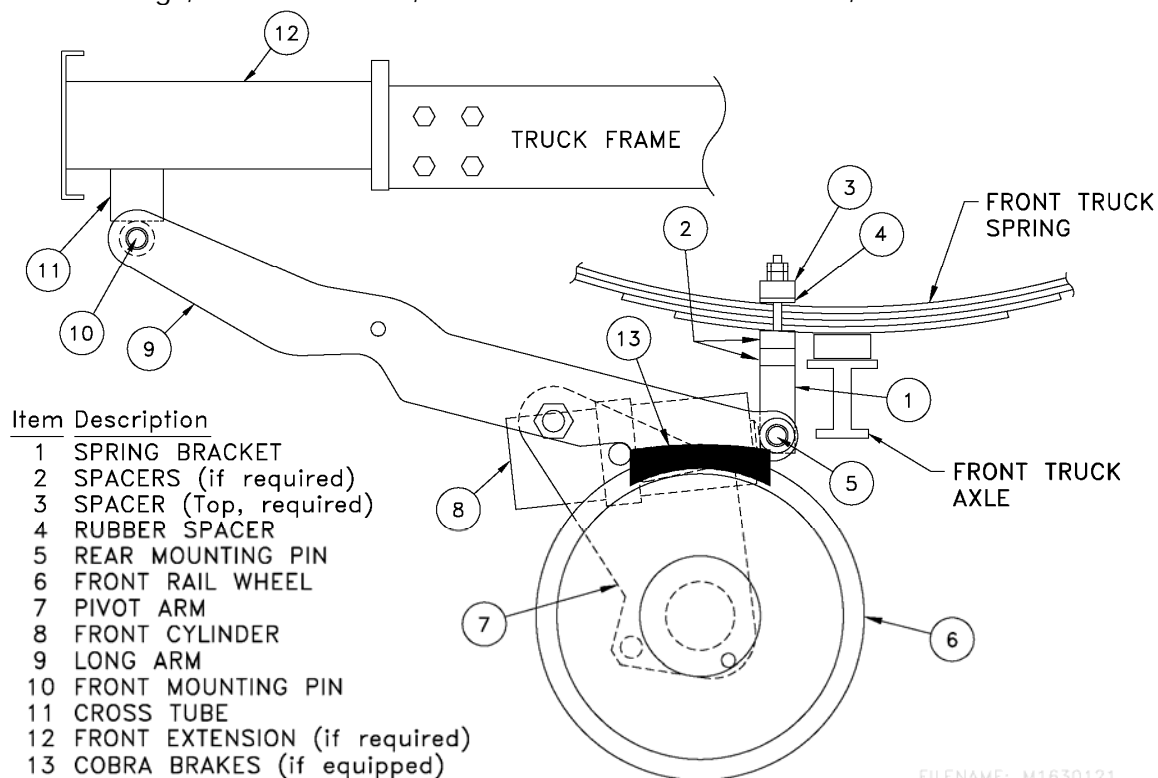
Figure 1.2.1 shows the individual parts of the installed front Railgear. These item descriptions will be used throughout this installation manual. DMF Railgear assemblies are also referred to as guide wheels, Rail wheels, or hi-rail gear.

Front Railgear attached to front vehicle springs and front bumper, with 16" guide wheels  
GVWR Range: 33,000 lbs. and above

Approx. Installed Weight (Front): 1385 lbs.

Capacity: 40,000 pounds per Railgear axle @ 20 MPH

For parts drawings, see Section 8.0, and for installation instructions, see Section 4.0.



**Figure 1.2.1** Front Railgear Components

**1.2.2 Behind Cab Front Railgear Components**

DMF Behind Cab Front Railgear uses the RW-1650 axle and wheels.

Front Railgear mounted to truck frame behind the vehicle cab, with 16" guide wheels

GVWR Range: 33,000 lbs. and above, for heavy load applications

Approx. Installed Weight (Front): 1800 lbs.

Capacity: 70,000 pounds per Railgear axle @ 20 MPH

For parts drawings, see Section 8.0, and for installation instructions, see Section 4.0.

**1.2.3 Under Cab Front Railgear Components**

DMF Under Cab Front Railgear uses the RW-1630 axle and wheels.

Front Railgear mounted to truck frame underneath the vehicle cab, with 16" guide wheels

GVWR Range: 33,000 lbs. and above

Approx. Installed Weight (Front): 1700 lbs.

Capacity: 40,000 pounds per Railgear axle @ 20 MPH

For parts drawings, see Section 8.0, and for installation instructions, see Section 4.0.

## 1.3 REAR RAILGEAR

### 1.3.1 Rear Railgear Components (Including RW-1630 and RW-1650)

DMF offers two different variations of Rear Railgear, RW-1630 and RW-1650. The components are the same, other than the axles and wheels, which have different weight capacities.

#### RW-1630

GVWR Range: 33,000 lbs. and above

Approx. Installed Weight (Rear): 1185 lbs.

Capacity: 40,000 pounds per Railgear axle @ 20 MPH

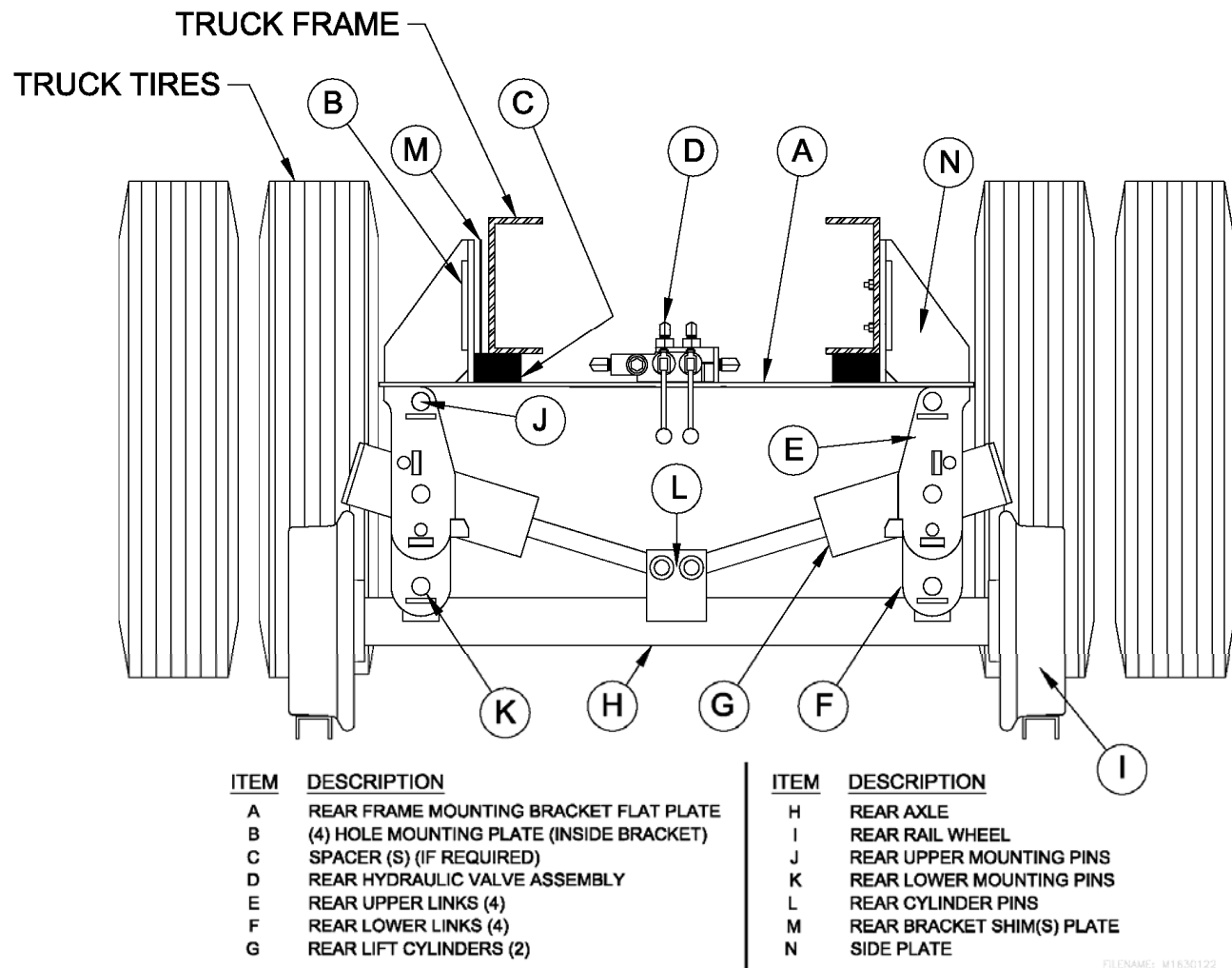
#### RW-1650

GVWR Range: 33,000 lbs. and above, for heavy load applications

Approx. Installed Weight (Rear): 1385 lbs.

Capacity: 70,000 pounds per Railgear axle @ 20 MPH

Figure 1.3.1 shows the individual parts of the installed rear Railgear with the rail wheels in the rail position. These item descriptions will be used throughout this installation manual.



**Figure 1.3.1** Rear Railgear Components

For parts drawings, see Section 7.0, and for installation instructions, see Section 4.0.

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## SECTION 2.0 OPERATIONS

<b>2.1</b>	<b>BEFORE YOU OPERATE THE RAILGEAR .....</b>	<b>2-2</b>
2.1.1	Familiarize Yourself with the Railgear .....	2-2
2.1.2	Daily Inspection.....	2-2
<b>2.2</b>	<b>ANTI-LOCK BRAKE SYSTEM (ABS) .....</b>	<b>2-3</b>
2.2.1	Trucks Equipped with ABS .....	2-3
2.2.2	Rail Operation of Trucks with ABS .....	2-3
<b>2.3</b>	<b>HIGHWAY OPERATION .....</b>	<b>2-4</b>
<b>2.4</b>	<b>GETTING ON THE RAIL .....</b>	<b>2-4</b>
2.4.1	Getting onto the Rail .....	2-4
2.4.2	Lower Rear Guide Wheels.....	2-4
2.4.3	Lower Front Guide Wheels.....	2-4
2.4.4	On the Tracks.....	2-5
<b>2.5</b>	<b>GETTING OFF THE RAIL.....</b>	<b>2-5</b>
2.5.1	Removing Truck from Track.....	2-5

## 2.1 BEFORE YOU OPERATE THE RAILGEAR

### 2.1.1 Familiarize Yourself with the Railgear

#### Clearances & Approach Angles

The installation of Railgear typically reduces the ground clearance & approach angle in the front and back. In some installations, the guide wheels extend slightly beyond the corners of the front bumper. Operators should familiarize themselves with the modified clearance & approach angles.

#### Pin-off Systems and Locations

Walk around vehicle and identify the location and type of pin-off system(s) that are installed on this particular vehicle. Please note that front and rear Railgear may have different types of pin-off systems (i.e. front may be manual, while rear may be cable pin-offs). See section 5.0 for more information on pin-offs.

DMF offers the following Pin-Off options:

- Manual Pin-Offs
- Cable Remote Pin-Offs
- Air Remote Pin-Offs

#### **NOTE:**

DMF's Rear Cylinders are equipped with integral locking valves, however, pin-offs are still required in both the rail and highway positions.

#### Operation Controls

- Locate and familiarize yourself with the front and rear Railgear operating controls
- Locate Power Take-Off (PTO) toggle/switch control and indicator light, typically found on the dashboard
- If your truck is equipped with Railgear brakes, locate the brake switch on the dashboard of the truck
- Identify the type of steering lock used on your truck

### 2.1.2 Daily Inspection

Before operating your Railgear-equipped vehicle, whether for highway or rail use, it is imperative that you perform a daily inspection – see Section 3.1.1 for Daily Inspection List. If any items found during your inspection do not conform to requirements, it is your responsibility to take corrective action before any use of the vehicle.

## 2.2 ANTI-LOCK BRAKE SYSTEM (ABS)

### 2.2.1 Trucks Equipped with ABS

All medium and heavy duty trucks manufactured after March 1, 1998, and equipped with air brakes, are required by federal law to also include ABS. The system is designed to prevent wheel lock-up during braking.

The ABS consists of wheel speed sensors, an **“ECU”** (electronic control unit) and all wiring and airlines that link the ABS components to the brakes and the truck’s electrical system.

During braking, the sensors will detect if one or more of the wheels are locking and automatically engage the ABS. The ECU then signals the system to apply and release brake pressure as much as 15 times per second, allowing the wheel(s) to turn just enough to maintain optimum traction.

Vehicles equipped with WABCO or Allied-Bendix ABS have an amber dash-mounted warning / diagnostic lamp. During normal road operation, the lamp will come ON when the truck engine is started and, depending on the type of system, will go OFF after about 3 seconds or when the truck reaches a speed of approximately 5-7 mph. A self-diagnostic check of the ABS is conducted during this time. If the lamp stays on, or comes on any other time during road operation, a possible malfunction is indicated, which will shut off only the part of the system at fault. The affected wheel(s) will revert back to conventional braking. For complete information and instructions relative to the ABS system, please refer to the truck’s operation manual.

### 2.2.2 Rail Operation of Trucks with ABS

When the Railgear is in the rail position, the front truck tires are lifted off the ground. This may produce an ABS fault and cause the ABS light to illuminate. In this condition, the brakes will still function but the ABS system will not. If the amber ABS dash light remains on during rail operation, the truck engine must be turned off and restarted after returning to highway operation. This will clear the ABS light after a few seconds. If the amber light remains on during road operation, the truck’s brake system may have an active fault and should be checked out. Please refer to the truck’s operation manual.

## 2.3 HIGHWAY OPERATION

Before operating a Railgear-equipped vehicle on the highway:

1. Verify Railgear is in highway position
2. Verify pins are properly and fully inserted in both front and rear Railgear (even if the Railgear on your truck is equipped with a locking valve system, you MUST verify that the pins are correctly inserted)
3. Steering wheel lock has been removed (if applicable)
4. Verify that Railgear brakes have been disengaged (if applicable)
5. Verify PTO has been disengaged and that the indicator light is OFF

## 2.4 GETTING ON THE RAIL

### 2.4.1 Getting onto the Rail

1. At the track crossing, drive past the track, then back the vehicle onto the rails. Engaging the rear Railgear first will allow your vehicle to side-shift and align itself to the rail, making it easier to engage the front Railgear.
2. Engage the truck's parking brake to prevent the truck from rolling.

### 2.4.2 Lower Rear Guide Wheels

3. If the Railgear has brakes, turn brake switch on.
4. Engage the PTO, leave the truck running and the transmission in neutral gear.
5. Remove the safety pin-off pins (4 pins: 2 front and 2 rear, on both driver and passenger sides). If pins are too tight to be easily removed, verify that Railgear is fully raised by briefly pulling (bumping) the valve handle toward you.
6. Push valve handles to lower wheels and engage rail.
7. To assist with alignment of the wheels to the rail, you can also use the valve handles independently to lower one side at a time to engage the rail, at which point you can then lower the opposite side. This will cause your vehicle to side-shift and align itself with the rail.
8. When both wheels are in rail position and properly engaging rail, replace safety pin-off pins.

### 2.4.3 Lower Front Guide Wheels

9. If necessary, drive the truck into position to line up the front guide-wheels with the rail.
10. Ensure that the PTO is engaged (this was engaged during the lowering of the rear Railgear).
11. Ensure front safety pin-off pins are removed.
12. Check and make sure that the front guide wheels line up with the rail.
13. Push valve handle to lower wheels and engage rail.
14. If you do not require the use of the PTO for additional equipment, it can now be disengaged.
15. Disengage the truck's parking brake when you are ready to proceed.

#### NOTE:

The front guide wheel assembly is an over-center design and does not require safety pin-off pins engaged in rail mode.



#### 2.4.4 On the Tracks

- Do not exceed posted track speed limit, and at no time exceed 30 MPH while on the track.
- Be aware that some Railgear is insulated, and will not operate the crossing gate circuits. You are responsible for knowing if your Railgear equipped vehicle has insulated or non-insulated wheels. To assist in identifying insulated rail wheels, a grooved ring is machined around the inside of the front and rear driver's side wheels.
- All railroad rules and safety guidelines should be observed.
- Reduce speed while in reverse and/or at all crossings, curves, branch lines, switches and frogs (no more than a slow walking pace is recommended).
- Traction is reduced on the track, especially in wet conditions.
- Braking distance is increased on the track, especially in wet conditions.
- Do not slide tires or guide wheels on the tracks as this will cause premature wear.
- Do not exceed the maximum rated capacity of the equipment.
- On newer trucks with Anti-Lock braking systems, the amber 'ABS' dash light may remain on with the front wheels elevated. This will not affect rear truck braking or rail wheel braking.

## 2.5 GETTING OFF THE RAIL

### 2.5.1 Removing Truck from Track

1. Safely pull onto the track crossing, paying attention to traffic and other obstacles.
2. Set the truck parking brakes and engage the PTO.
3. Leave the truck running and the transmission in neutral gear.
4. Lift both sets of Railgear (there is no preference for removal order).
5. Engage all 4 safety pin-off pins in highway position (passenger and driver side, for both front and rear Railgear).
6. Disengage the switch that controls the Railgear brakes (if applicable).
7. Disengage the PTO and the parking brakes.
8. Make sure surrounding area is free and clear of any obstacles and vehicles before pulling off of the rail and onto the road.
9. If the amber ABS dash light remains on during rail operation, the truck engine must be turned off and restarted after returning to highway operation. This will clear the ABS light after a few seconds. If the amber light remains on during road operation, the truck's brake system may have an active fault and should be checked out. Please refer to the truck's operation manual.

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## SECTION 3.0 ROUTINE MAINTENANCE

<b>3.1</b>	<b>Inspection and Maintenance .....</b>	<b>3-2</b>
3.1.1	Daily .....	3-2
3.1.2	Weekly .....	3-2
3.1.3	Bi-annually .....	3-3
3.1.4	Annual Maintenance or as required .....	3-3
<b>3.2</b>	<b>Lubrication Specification.....</b>	<b>3-3</b>
<b>3.3</b>	<b>Troubleshooting.....</b>	<b>3-5</b>
3.3.1	Troubleshooting On-track Problems .....	3-5
<b>3.4</b>	<b>Derailment .....</b>	<b>3-6</b>

### 3.1 Inspection and Maintenance

If your Railgear vehicle is high-use or operated under extreme conditions, such as material handlers or weed-spraying vehicles, or such as operating in mountainous regions or extreme temperatures, the levels of inspections listed below may need to be performed more frequently than stated.

The following are instructions for routine inspections recommended by Diversified Metal Fabricators. In some circumstances, government or corporate regulations may require additional inspections be performed. Please ensure that you are aware of any inspection requirements that pertain to your Railgear and that you abide by all local and national laws regarding Railgear maintenance and safety.

#### 3.1.1 Daily

- Visually inspect for hydraulic fluid leaks.
- Check and make sure that all threaded fasteners are secured. NOTE: All hex nuts are either nylon insert or slotted hex nuts with cotter pins.
- Check and make sure all tie straps that secure hoses from moving parts and exhaust systems are in place. Replace if cracked or worn.
- Inspect wheel flanges for excessive wear, primarily noting differences in wear between wheels on the same axle or diagonally. If an abnormal pattern is noted, check Railgear alignment (see alignment procedure in Section 4.10).
- Inspect wheel “end-play”: Placing one hand at the 9 o’clock position and your other hand at the 3 o’clock position, firmly grab the wheel and push and pull it a few times. There should be no discernable movement in and out, and the wheel should rotate freely. If you feel there is too much movement in and out, or if the wheel does not rotate freely, a detailed inspection should be performed. See Sections 7.0 & 8.0 for appropriate axle assembly drawings.
- Throughout the day, inspect wheel temperature. If extremely hot, this could indicate bearing adjustment is too tight. For adjustment information, see Section 7.0 & 8.0 for appropriate axle assembly drawings.
- If your vehicle is equipped with DMF “two piece” wheels, check the bolt torque indicators (the tabs around each bolt) to ensure that they have not moved. If torque indicators are missing or damaged, please contact DMF for replacements. If torque indicators have moved, you must check bolt torque – see Section 5.4 for additional information.

#### 3.1.2 Weekly

Perform standard daily inspection points as listed above, and then check the following:

- Grease and lubricate all grease fittings on front and rear Railgear and guide wheel assemblies.

**NOTE:**

There are six (6) locations on front assembly and fourteen (14) locations on rear assembly. Stub axles will have an addition (2) grease fittings in the axle sleeve on the front axle. See Drawing in Section 3.2 for details.

- Check level of hydraulic oil and all other fluids.
- Check air pressure in tires and inflate to proper inflation pressure (if necessary).
- Inspect brakes and adjust if necessary. Refer to Section 5.3.6 & 5.3.7.
- Brake Testing
  - Operate the vehicle on a test track. With the “on/off” toggle valve “on” and the ball valve(s) open, check that:
    - (1) When the vehicle brake pedal is depressed, the guide wheel brakes clamp the Rail wheel enough to begin slowing its rotation, but not enough to totally lock the Rail

Wheel. The Rail Wheels should not be allowed to lock up since that will cause a flat spot on the wheel due to the sliding action on the rail.

- (2) The brakes properly release when the brake pedal is released.
- If brakes do not function properly, contact a Service Representative at DMF.

### 3.1.3 Bi-annually

Perform standard daily and weekly inspection points as listed above, and then check the following:

- Remove the hubcaps from the Rail wheels and inspect for deterioration or loss of wheel bearing grease. Unless there is a problem, the cavity may be topped off with the recommended grease without removing and/or re-packing the bearings.
- Clean the hubcap and mating surfaces and apply a bead of silicone gasket and re-attach securely.
- Clean the strainer / filter in the hydraulic power unit tank.
- Rail test for proper traction and adjust as appropriate (see Section 4.10).
- Rail test for proper braking and adjust as appropriate (see Section 5.3).
- Check Railgear alignment (see Section 4.10)

### 3.1.4 Annual Maintenance or as required

In addition to the items listed in 3.1.1 Daily Maintenance, 3.1.2 Weekly Maintenance and 3.1.3 Bi-annual Maintenance; perform the following:

- Disassemble, inspect, repack and reassemble Rail Wheel Bearings as shown in Sections 7.0 & 8.0.

## 3.2 Lubrication Specification

Hydraulic Oil:

- ASTM D6158 HM (Unax RX-46 Hydraulic Oil, Shell Tellus EE 46 or equal)  
OR
- Some customers operate on Dexron III ATF

Wheel Bearing Grease / Grease Fittings:

- **Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
- **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)



### 3.3 Troubleshooting

#### 3.3.1 Troubleshooting On-track Problems

Symptom	Possible Cause	Diagnostic Step	Corrective Action
Rail wheel vibration/ noise	Damaged Tread/Flange	Inspect treads/Flange	Replace wheel
	Patterned Wear on Tread/Flange	Inspect treads/Flange	Replace wheel
	Loose Wheel	Check wheel end play (detailed instructions at Section 7.0 & 8.0 for appropriate wheel & axle assy. drawings)	Follow detailed instructions at Section 7.0 & 8.0
Vehicle tracking to one side, wandering	Misalignment	Check Alignment (see Section 4.10)	Adjust Alignment
	Overload or load imbalance	Visually inspect, scale vehicle	Unload and/or redistribute load
	Un-Even Rail Wheel Load/ Vehicle Load	Weigh Vehicle and Check Rail Wheel Load	Adjust Load Distribution and Re- set Rail Wheel Load
	Excessive Wheel Wear	Check Alignment and Wheel Wear	Adjust Alignment, Replace Worn Wheels
Insufficient traction or braking	Rail Wheel Load set too low	See Section 4.10	Set Rail Wheel Load
	Tires worn	Inspect Tires	Replace tires

**Table 3.1.1** Troubleshooting On-Track Problems

### 3.4 Derailment

In the case of a minor derailment, the cause of the derailment should be determined and corrective steps taken. The vehicle should be inspected to determine if repairs or adjustments are required. This inspection should include, but should not be limited to, the following:

- Visually inspect Railgear for hydraulic leaks
- Ensure all lines and hoses are still secured and out of the way of any moving parts
- Ensure all hydraulic hose connections and fittings are securely in place and not broken
- Verify that all threaded fasteners are secure, and that cotter pins are not broken
- Visually inspect wheels to ensure that tread and flange are not severely damaged
- Spin all 4 Rail wheels, noting any bearing noise, resistance, and end play

Any items noted should be repaired using specifications in the manual, to ensure they are repaired to initial install standards.

In case of a major derailment, a complete inspection should be performed, including but not limited to the following:

- Perform all inspection items as listed above in the Minor Derailment section
- Inspect all long arms, pivot arms, and links, to ensure they are not bent, cracked, or broken
- Inspect and test rail brake system (see Section 5.3).
- Ensure spring brackets are securely fastened, and are not bent, cracked or broken
- Ensure all welds are intact and show no signs of cracking or breaking
- Ensure all mounting hardware and brackets are securely fastened, and are not bent, cracked, or damaged in any way
- A full alignment should be performed. See section 4.10.
- Wheels should be removed and the bore, bearings, races, and insulation (if applicable) should be inspected for any damage. For further wheel details, see section 7.0 & 8.0 for appropriate wheel & axle assembly drawings.
- Ensure axle threads are not stripped or damaged

Any items noted should be repaired using specifications in the manual, to ensure they are repaired to initial install standards.

Please contact DMF for any assistance you may require.



# SECTION 4.0 RAILGEAR INSTALLATION

<b>4.1</b>	<b>PRE-INSTALL.....</b>	<b>4-3</b>
4.1.1	Safety Statements .....	4-3
4.1.2	Installation Order.....	4-3
4.1.3	Required Tools & Materials .....	4-3
4.1.4	Bolt Torque Specifications .....	4-3
4.1.5	Welding Information.....	4-5
<b>4.2</b>	<b>INITIAL INSTRUCTIONS.....</b>	<b>4-5</b>
4.2.1	Work Area .....	4-5
4.2.2	Truck Condition .....	4-5
4.2.3	Hydraulic System.....	4-6
4.2.4	Front and Rear Installation Rails .....	4-6
4.2.5	Installation Rails .....	4-6
<b>4.3</b>	<b>INSTALLATION OF REAR RAILGEAR .....</b>	<b>4-7</b>
4.3.1	General Information .....	4-7
4.3.2	Diagram of Key Components .....	4-8
4.3.3	Location of Rear Railgear .....	4-9
4.3.4	Location and Clearance of Railgear .....	4-9
4.3.5	Shimming and Temporarily Spacing Rear Bracket .....	4-10
4.3.6	Square Rear Railgear with Truck Axle .....	4-10
4.3.7	Squaring up Rear Railgear to Truck Frame.....	4-11
4.3.8	Temporarily Securing Rear Bracket.....	4-11
4.3.9	Mounting Plate Installation .....	4-12
4.3.10	Tack Welding of Spacer .....	4-12
4.3.11	Final Rear Railgear Alignment and Weight Settings.....	4-12
<b>4.4</b>	<b>VARYING FRONT RAILGEAR CONFIGURATIONS .....</b>	<b>4-13</b>
4.4.1	Traditional Long Arm Assembly .....	4-13
4.4.2	Cargo Arm Assembly .....	4-13
4.4.3	Mid-Mount Assembly .....	4-13
<b>4.5</b>	<b>TRADITIONAL LONG ARM ASSEMBLY INSTALLATION.....</b>	<b>4-14</b>
4.5.1	General Information .....	4-14
4.5.2	Diagram of Key Components .....	4-14
4.5.3	Frame Extension Installation .....	4-15
4.5.4	Bridge Kit Information .....	4-15
4.5.5	Front Mounting Dimensions .....	4-18
4.5.6	Mount Front Railgear .....	4-18
4.5.7	Front Railgear Clearance .....	4-20
<b>4.6</b>	<b>CARGO ARM FRONT ASSEMBLY INSTALLATION .....</b>	<b>4-21</b>
4.6.1	Front Cargo Arms .....	4-21
4.6.2	Diagram of Key Components / Front Mounting Dimensions .....	4-21
4.6.3	Mount Front Railgear .....	4-21
<b>4.7</b>	<b>COMPLETING FRONT INSTALLATION.....</b>	<b>4-23</b>
4.7.1	Align Front Railgear.....	4-23
4.7.2	Final Steps.....	4-25
<b>4.8</b>	<b>UNDER CAB FRONT UNIT INSTALLATION .....</b>	<b>4-26</b>
4.8.1	Under Cab General Information .....	4-26

4.8.2	Dismantle .....	4-27
4.8.3	Mounting .....	4-27
4.8.4	Axle Adjustment .....	4-27
4.8.5	Welding.....	4-27
4.8.6	Remote Air Pin-Off Installation.....	4-28
4.8.7	Completion .....	4-28
<b>4.9</b>	<b>BEHIND CAB FRONT UNIT INSTALLATION.....</b>	<b>4-30</b>
4.9.1	Behind Cab General Information .....	4-30
4.9.2	Dismantle .....	4-31
4.9.3	Installation .....	4-31
4.9.4	Completion .....	4-32
<b>4.10</b>	<b>OVERALL ALIGNMENT PROCEDURE .....</b>	<b>4-32</b>
4.10.1	Overall Alignment Procedure and Final Weight Adjustment .....	4-32
<b>4.11</b>	<b>RAIL TEST .....</b>	<b>4-34</b>
<b>4.12</b>	<b>FINAL WELD-OUT .....</b>	<b>4-34</b>
<b>4.13</b>	<b>INSTALL DECALS .....</b>	<b>4-36</b>
<b>4.14</b>	<b>VELCRO STEERING WHEEL LOCK .....</b>	<b>4-38</b>
<b>4.15</b>	<b>INSTALLATION REVIEW CHECKLIST.....</b>	<b>4-39</b>

## 4.1 PRE-INSTALL

**NOTE:**

The proper installation of this equipment is solely the responsibility of you, the installer.  
When in doubt, contact DMF for assistance.

**NOTE:**

During Railgear installation, there are 3 different alignments - front Railgear to truck frame, rear Railgear to truck frame, and a final procedure that aligns both sets of Railgear to each other.

### 4.1.1 Safety Statements

- Always block up gear before getting underneath
- Always use jack stands when jacking up vehicle
- Use personal protective equipment and clothing

### 4.1.2 Installation Order

This manual presents the installation information in the order that we find to work best. Your shop, tools, personnel or other factors may dictate a different order. This is acceptable as long as the Rail Test, Road Test, and Final Inspection are performed at the end.

### 4.1.3 Required Tools & Materials

Aside from general shop tools and safety equipment the following tools will be required:

- Arc or MIG Welder
- Surge Protector (Protects ECM from damage during welding)
- Cutting Torch
- Hand Grinder
- Frame Drill
- Air Saw
- Angle Finder
- Test Rail – See Section 4.2.4
- Hydraulic Oil: ASTM D6158 HM (Unax RX-46 Hydraulic Oil, Shell Tellus EE 46 or equal), or some customers operate on DEXRON III ATF Fluid
- Wheel Bearing Grease / Grease Fittings:
  - **Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
  - **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)

Additionally the following tools are recommended:

- Transmission Jack, Motorcycle Lift, Pallet Jack or Forklift
- Overhead Crane
- Work Lights
- Wheel Dolly

### 4.1.4 Bolt Torque Specifications

See following page for recommended torque specifications.

TITLE: Purchased Fastener Torque Specification

ITEM	PART NO.	QTY	DESCRIPTION
1			
2			

PURPOSE: To Establish Production Methods For The Installation Of Commonly Purchased Threaded Fasteners.

COMMON USAGE: Most Areas Of Multiple Part Assembly And Retention.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Most Common Sizes Of SAE J429 Grade 5 And 8 And Of ASTM A574 "Alloy" Bolts.

PROCEDURE: A) Identify The Fastener As Either Fine Or Coarse Thread, Select The Appropriate Chart Below.

B) Identify The Fastener Size (Diameter And Threads Per Inch), Select The Appropriate Row In The Chart Selected.

C) Identify Grade Of The Bolt.

D) Identify Whether The Bolt Is Plated Or Plain.

E) Read Across The Size Row And Down The Grade And Plain Or Plated Column. The Intersection Of Row And Column Gives Torque.

#### FINE THREAD BOLTS

SIZE (DIA-TPI)	SAE J429 GRADE 5 (3 MARKS)		SAE J429 GRADE 8 (6 MARKS)		ASTM A574 ALLOY (KNURLED OD)	
	PLAIN (FTLB)	PLATED (FTLB)	PLAIN (FTLB)	PLATED (FTLB)	PLAIN (FTLB)	PLATED (FTLB)
5/16-24	19	14	27	20	27	20
3/8-24	35	26	49	35	47	55
7/16-20	55	41	78	58	75	56
1/2-20	90	64	120	90	115	86
9/16-18	120	90	170	130	165	125
5/8-18	170	130	240	180	220	165
3/4-16	300	225	420	315	400	300
7/8-11	445	325	670	500	635	475
1-12	645	485	995	745	915	685
1 1/8-12	890	670	1445	1085	1385	1040
1 1/4-12	1240	930	2010	1510	1885	1415
1 3/8-12	1675	1255	2710	2035	2440	1830
1 1/2-12	2195	1645	3560	2670	3275	2455

RECOMMENDED TORQUE  
FOR GR 8 W/  
PREVAILING TORQUE NUT

SIZE	FT-LB
1/2-13	55
1/2-20	60
5/8-11	120
5/8-18	125
3/4-10	180
3/4-16	180
1-8	400
1-14	425

#### COARSE THREAD BOLTS

(MATCHING  
HEX NUTS)

SIZE (DIA-TPI)	SAE J429 GRADE 5 (3 MARKS)		SAE J429 GRADE 8 (6 MARKS)		ASTM A574 ALLOY (KNURLED OD)	
	PLAIN (FTLB)	PLATED (FTLB)	PLAIN (FTLB)	PLATED (FTLB)	PLAIN (FTLB)	PLATED (FTLB)
5/16-18	17	13	25	18	25	19
3/8-16	31	23	44	33	45	34
7/16-14	49	37	70	52	70	53
1/2-13	75	57	105	80	108	81
9/16-12	110	82	155	115	155	115
5/8-11	150	115	220	160	210	160
3/4-10	265	200	375	280	365	275
7/8-9	395	295	605	455	585	440
1-8	590	445	910	680	865	650
1 1/8-7	795	595	1290	965	1240	930
1 1/4-7	1120	840	1815	1360	1750	1315
1 3/8-6	1470	1100	2380	1780	2315	1735
1 1/2-6	1950	1460	3160	2370	3040	2280

#### COMMENTS:

A) Torque values specified are for bolts with residual oils or no special lubricants applied. If special lubricants of high stress capacity (such as Never-Seez, graphite and oil, molybdenum disulphite, colloidal copper or white lead) are applied, multiply the torque values in charts by 0.90. The use of Loctite does not affect the torque values in charts.


B) All values are in Foot-Pounds (FTLB). Multiply by 12 for Inch-Pounds.

C) Flat washers of equal strength must be used.

D) Bolt manufacturer's specs should be used when available.

E) Plated values in charts are for Cadmium. Multiply by 1.87 for Zinc.

F) Never re-use a highly stressed, torqued fastener: IT MAY FAIL!

	12/29/99	ADDED RECOMMENDED TORQUE CHART	LOR	
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRACTIONAL: ± 1/32 FRACTIONAL: ± 1/16 X ± .063 XX ± .030 XXX OR XXXX ± .005 DRILL SIZES: ± .005 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES		TITLE: PRODUCTION PROCEDURE 006 FASTENER TORQUE SPECIFICATION DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		
DRAWN BY:	APPD BY:	DATE:	DRAWING NUMBER:	REV:
TSH		06/02/94	PP006	A

### 4.1.5 Welding Information

- Dual Shield Wire spec. → AWS E71T-1
- Low Hydrogen spec. → AWS E-7018

Low Hydrogen Electrodes (AWS E-7018)

Manufacturer	Equivalent Rod
Air Products	AP-7018, 7018IP
Airco	7018C, 7018-A1
Arcos	Ductilend 70
Air Products	170-LA, SW-47,616
Chemtron	170-LA, SW-47,616
Hobart	718, 718-SR
Marquette	7018
McKay Co	7018
Reid-Avery	7018
Uniblaze	7018
Westinghouse	Wiz-18
Lincoln	Jetweld LH-70

**Table 4.1.5** Manufacturer Equivalent Welding Rod

## 4.2 INITIAL INSTRUCTIONS

### 4.2.1 Work Area

The area in which the Railgear installation is to occur should meet minimum requirements in order to facilitate the process and provide adequate conditions in which the work can be completed safely, accurately and in a timely manner.

- Floor - The floor should be level in order to provide good measurements required to check the alignment of the Railgear.
- Lighting - The work area should be adequately lighted.
- Space - There should be enough space to maneuver the Railgear components into position and to safely work around other equipment.

### 4.2.2 Truck Condition

Before installation, the truck should be checked in some important areas.

- Tires - The tire pressure should be checked for the manufacturer's recommended inflation and for consistent pressure readings from all the tires. This will ensure correct traction of the tires on the rail. Also the condition of the rear tires needs to be determined. If the rear tires are worn, they should be replaced.
- Alignment - Rear truck axle must be square with truck frame. DMF recommends that a reputable alignment shop check this. 0-degree thrust angle (which may be different than the factory specification) is required for proper Railgear operation.
- Frame & Suspension - On a new truck, these should be in good condition. On a used truck, the frame should be inspected to ensure that it has not been damaged or bent. The suspension bushings should also be examined for excessive wear and replaced if necessary. If any problems in these areas are not corrected, it will cause difficulties aligning and operating the Railgear.
- Transverse Torque Rods - On vehicles that will regularly experience high center of gravity loads on rail (e.g. spray trucks, material loaders), it is advisable to install rear tandem control rods to limit transverse axle displacement. This is also necessary on long wheelbase vehicles to prevent front tandem walking off in curves.

### 4.2.3 Hydraulic System

The truck should have a hydraulic system installed before installing the railgear. Hydraulic pressure will be needed to assist during the installation process. Please see section 6.0 for information on installing or modifying an existing hydraulic system for railgear.

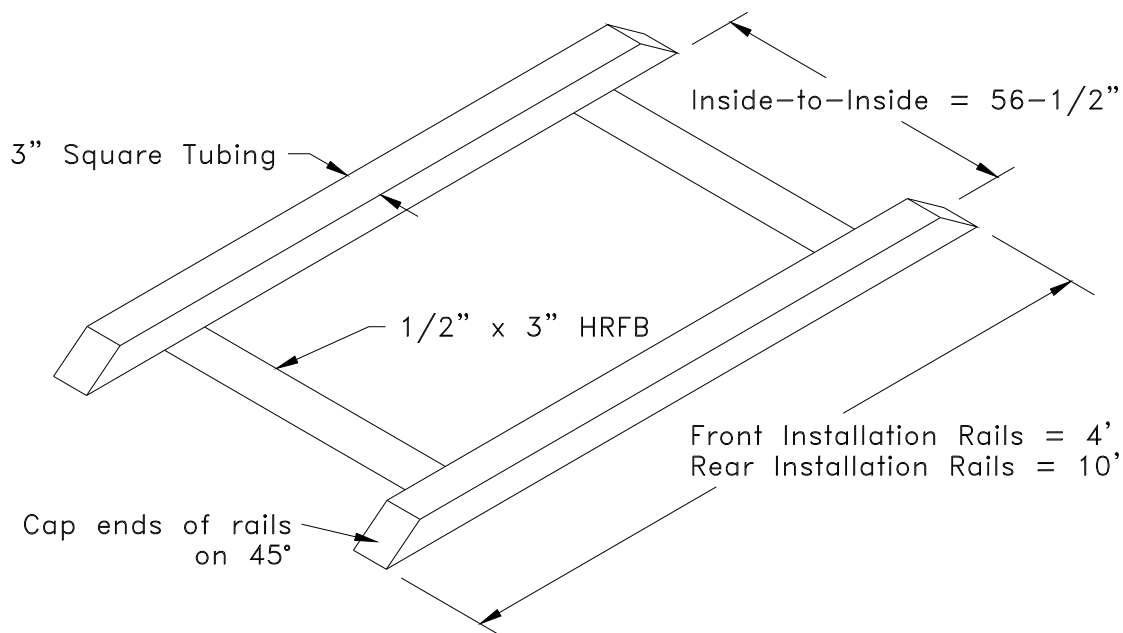
### 4.2.4 Front and Rear Installation Rails

In order to install the Railgear to get proper tire traction on the rail, it is necessary that standard gauge rails or Installation Rails be fabricated from 3" square tubing per Figure 4.2.4. Drive the truck into the work area (pulling forward and back several times to align the axles) and up onto the Rear Installation Rails. The rear inside tires should be on the rails with the rear outside tires off the floor. The Front Installation Rails are not needed at this point.

**NOTE:**

Before proceeding, be certain that the front truck tires are chocked & the parking brake is set.

### 4.2.5 Installation Rails



**Figure 4.2.4** Installation Rails

**NOTE:**

Inside-to-Inside measurement of 56-1/2" is the standard gage for the United States. If your equipment is to be operated on any other gauge, adjust measurements according.

## 4.3 INSTALLATION OF REAR RAILGEAR

**NOTE:**

Only use GRADE 5 bolts when attaching rear bracket on the truck frame. The rear bracket should break away from the truck frame in an accident otherwise it will damage your truck frame.

### 4.3.1 General Information

There are several items to note before you begin the installation of the rear Railgear:

- Before you begin Railgear installation, please read installation instructions for the options you have ordered. Some options may affect the Railgear installation process.
- It is important to note that there is a difference between “shims” and “spacers”. Shims are vertical fillers, used to fill in the gaps between the truck frame and rear mounting bracket side plates. Spacers are solid steel pieces varying in thickness, used between the rear mounting bracket and the bottom of the truck frame to achieve proper weight settings between the truck tires and rail wheels while on rail.
- “Spacers” used in adjusting the height of the rear bracket must be solid steel pieces because they will experience the full structural load seen by the rear frame.
- When setting the height of the rear bracket using “spacers” you must be within the range of ½” minimum to 3” of spacers maximum. If you are outside of this range it may be necessary to change out your links. See Section 7.0 for different link measurements and contact DMF for final consultation before ordering a different set of links. DMF will not be responsible if the links are changed from the initial order without consulting with DMF.
- Before permanently affixing your rear bracket to the truck frame (including welding or drilling holes), be aware that during the locating, shimming (if necessary), spacing, squaring, and weight setting procedures, your rear bracket will be making slight movements during each of these steps. So you will want to only TEMPORARILY secure Railgear using clamps, chains, fork lift, etc. after each procedure.
- The rear Railgear is usually installed with the Safety Pin-Offs (manual, cable or air operated) facing towards the rear of the truck. However, truck work body may dictate locating the Safety Pin-Offs on the front side. If the Rear Pin-Offs must be located toward the front and the Railgear is supplied with insulated Rail Wheels, make sure to swap the left and right Rail Wheels (see Section 7.3). The insulated Rail Wheels should always be on the driver’s side of the Railgear.
- It is important that the truck tire pressure (especially the rear tires) be checked and brought to the tire manufacturer’s intended pressure for a given load. Reference your tire manufacturer’s load rating and inflation chart. (Inflating tires to their max side wall pressure may result in drastically reduced contact with the rail if under-loaded)
- If the rear truck frame does not extend the minimum of 21-1/4” for single axle or 17-1/4” for tandem axle trucks, it should be properly lengthened to provide the necessary mounting clearance for the Railgear.

4.3.2 Diagram of Key Components

Figure 4.3.2 shows the individual parts of the installed rear Railgear. Please familiarize yourself with these item descriptions as they will be used throughout this installation manual.

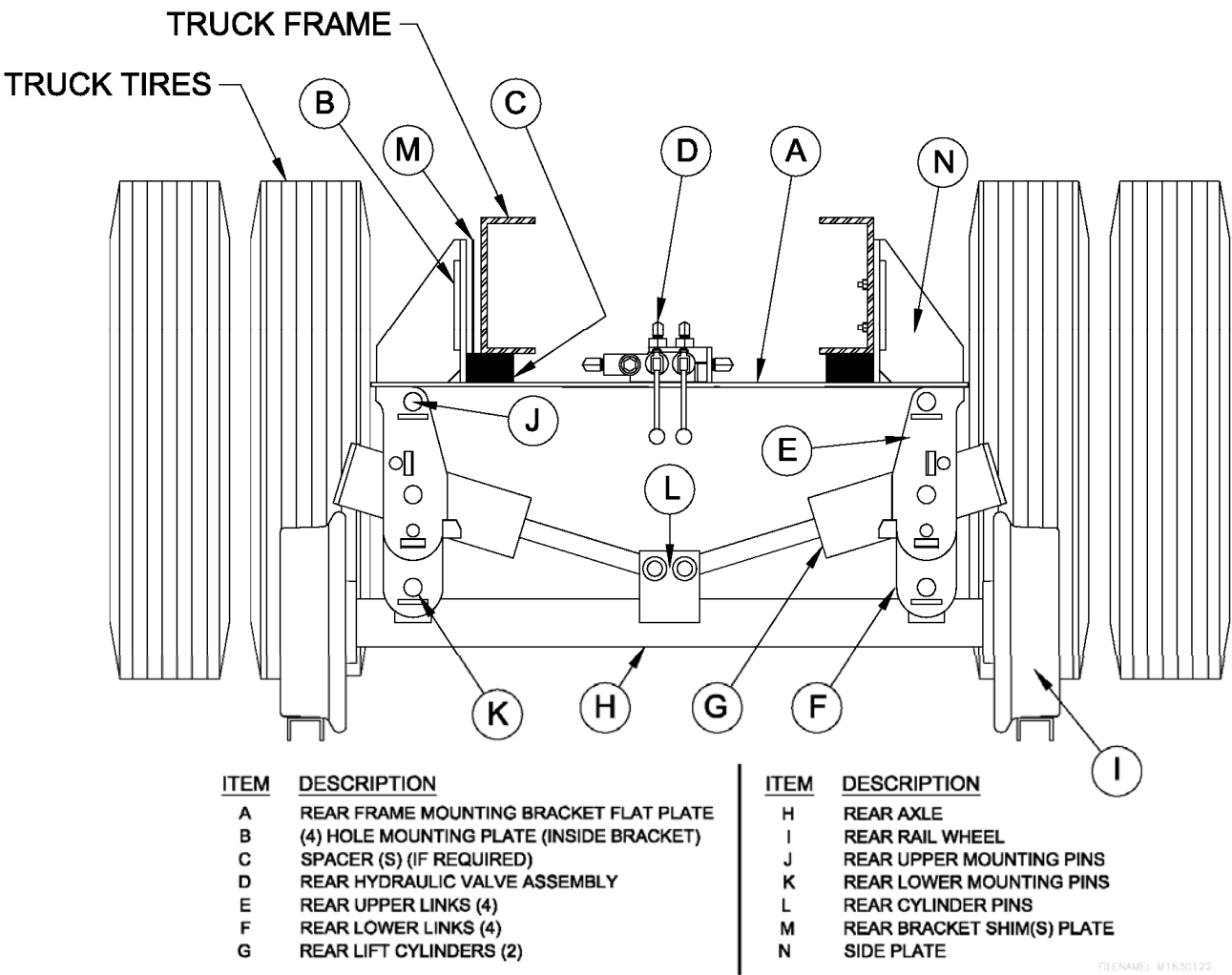


Figure 4.3.2 Diagram of Key Components



### 4.3.3 Location of Rear Railgear

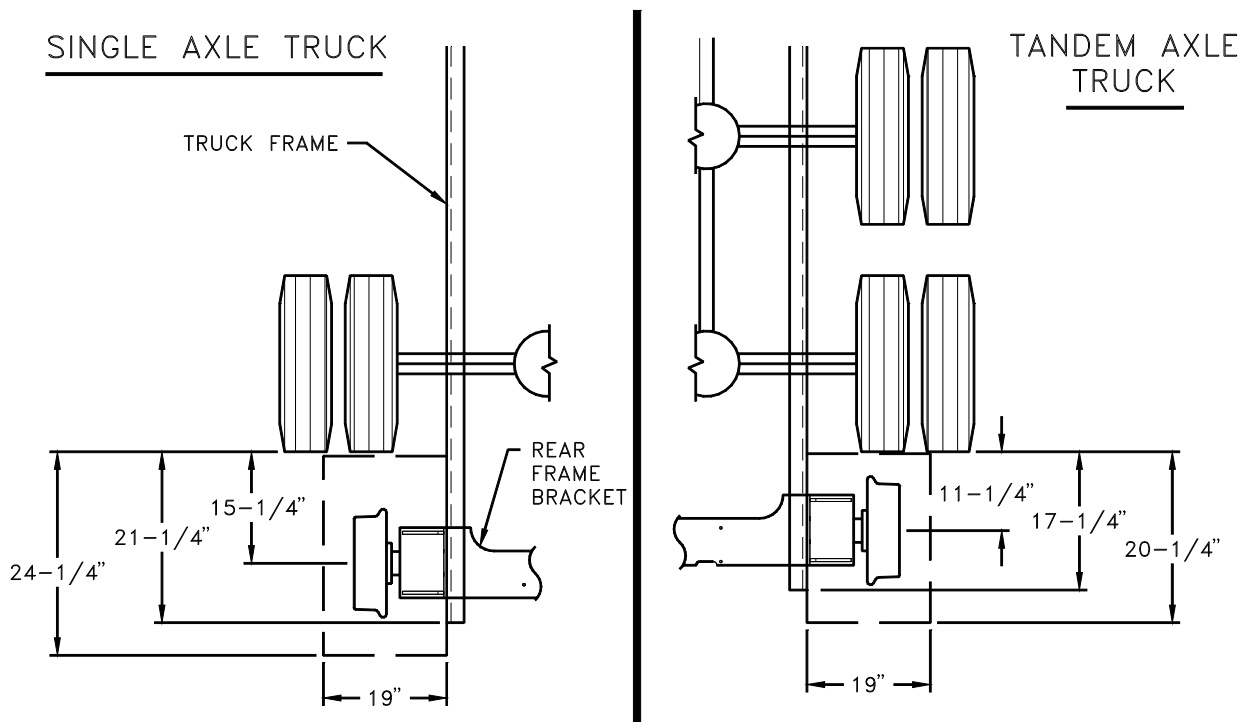
Position the rear Railgear as close to the rear tires as practical (allowing clearance for mud flaps). Table 4.3.3 gives standard location and clearance guidelines for the rear Railgear and these dimensions are shown in Figure 4.3.4. Generally, leave a minimum of 2" clearance to any tire, spring, or suspension components.

Minimum Distance from:	Single Axle:	Tandem Axle:
Rear Tire to Rail Wheel Center	15-1/4"	11-1/4"
Min. Truck Frame Extension (from rear edge of tire)	21-1/4"	17-1/4"
Minimum clearance area (from rear edge of tire)	24-1/4" x 19"	20-1/4" x 19"

**Table 4.3.3** Location of Rear Railgear

### 4.3.4 Location and Clearance of Railgear

The Railgear typically drops straight down, but it can also articulate from side-to-side to allow alignment of the vehicle with the rail. A clear space of 19 inches must extend outward from each side of the frame in this area to allow for proper articulation (see Figure 4.3.4). It is important that nothing encroach upon this space (e.g., outriggers, lift-gates, and body tie-down bolts).



**Figure 4.3.4** Location and Clearance of Railgear

### 4.3.5 Shimming and Temporarily Spacing Rear Bracket

Once Railgear is correctly located on rear frame, as above, if more than a 1/16" gap exists between the rear Railgear bracket side plate and the side of the truck frame, install equal amount of shims on each side to fill the gap, thus keeping the Railgear bracket centered. Note that DMF provides shims of different thicknesses, and it is important that the same amount of shim measurement is achieved on both sides.

With the rear bracket correctly located against bottom of frame rail and centered, there are two differing methods of setting a preliminary weight setting:

1. The first method is to measure from top of rear bracket plate to floor, and adjust bracket with temporary spacers, as shown in Table 4.3.5. This should provide a good starting point for final weight setting.

	26"	27"	28"	29"	30"	31"	32"	33"
Xtra Short Links	0"	1"	2"	3"				
Short Links			0"	1"	2"	3"		
Long Links					0"	1"	2"	3"

**Table 4.3.5** Shimming Chart

2. The second method is to insert the minimum (1/2") or maximum (3") of spacers, and then during the final weight setting, add or remove spacers as appropriate until optimal weight setting is achieved.

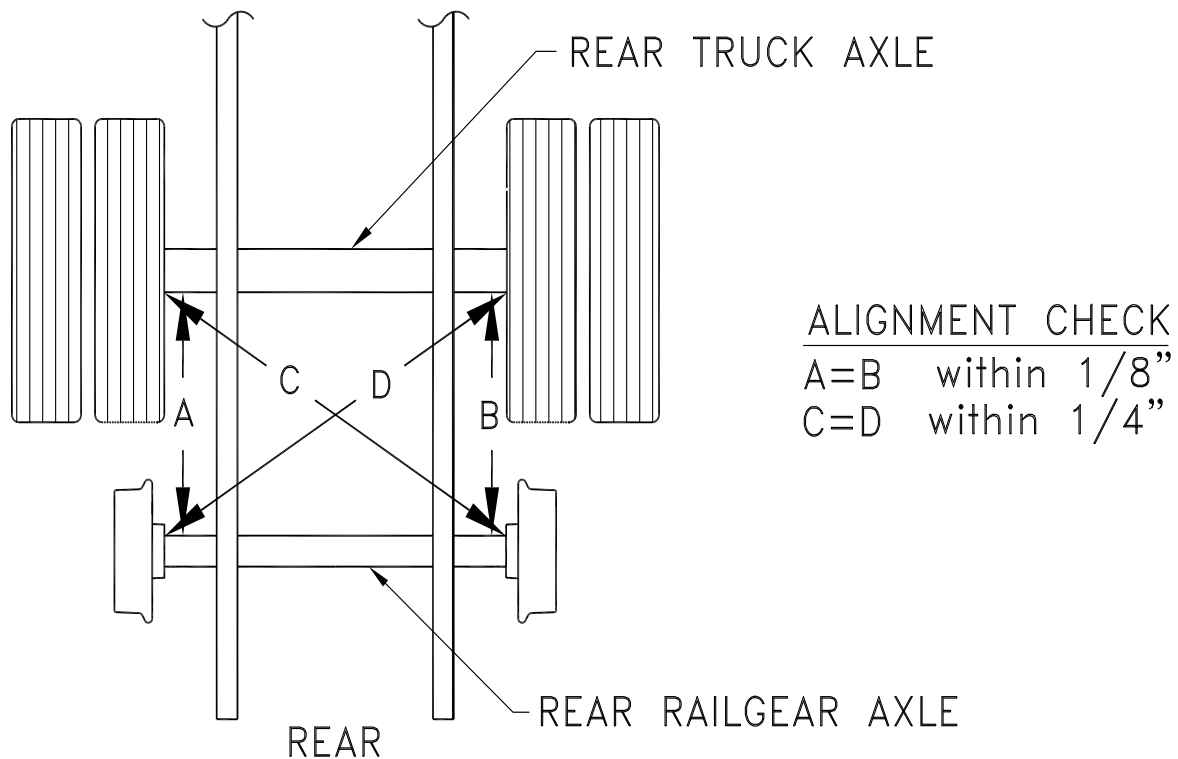
Once spacers are positioned, temporarily clamp, chain, or otherwise secure rear Railgear to truck frame. Keep in mind that spacers and rear bracket may have to be adjusted for final weight setting and squaring/aligning with the truck axle.

### 4.3.6 Square Rear Railgear with Truck Axle

The Rear Railgear needs to be made absolutely square with the rear truck axle. Four measurements (shown in Figure 4.3.7) need to be taken to ensure this requirement:

- (1) The distance from the truck axle to the Rear Railgear Axle at each end. In Figure 4.3.7, distance "A" must be equal to "B" (within 1/8"). This is an important alignment check.
- (2) The diagonal from the truck axle to the opposite Rear Rail Wheel. In Figure 4.3.7 distance "C" must be equal to "D" (within 1/4").

#### 4.3.7 Squaring up Rear Railgear to Truck Frame



**Figure 4.3.7** Squaring Rear Railgear

**NOTE:**

Although the previous mounting conditions and alignment may be met, be certain that enough room exists between the Rear Railgear and other equipment. In general, this should include a 2" clearance around the Railgear (more clearance will be needed if Remote Pin-offs are installed). Also ensure that there is clearance to remove the Pin-Offs from their holes.

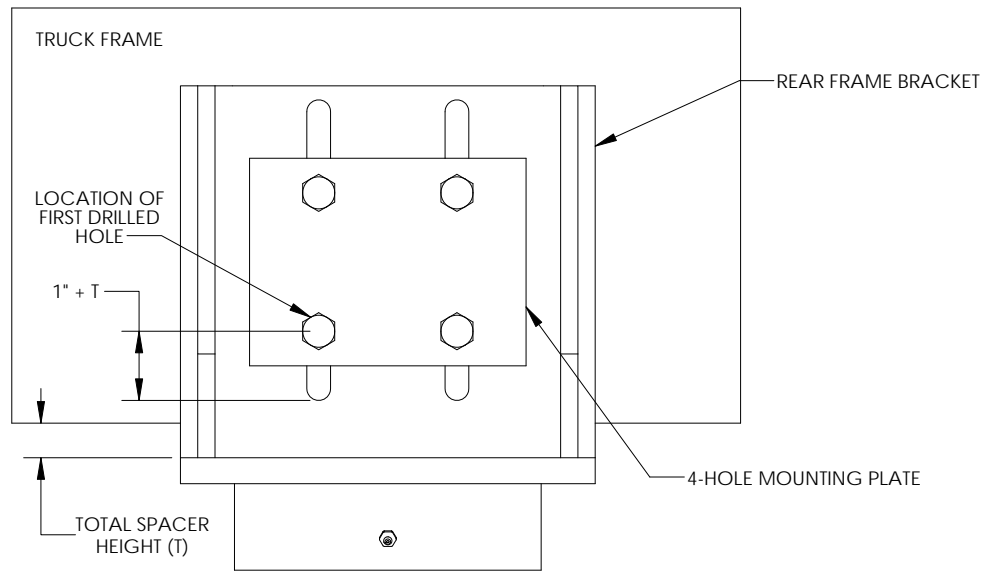
#### 4.3.8 Temporarily Securing Rear Bracket

Now that the rear bracket is correctly centered, vertically positioned, and aligned, measure 1" up from the bottom of the slot in the rear bracket slide plate, and drill your first  $\frac{5}{8}"$  hole through the shims (if applicable) and truck frame. If any spacers are installed, add the total spacer height to 1" dimension, see figure 4.3.9. Align this first hole with the 4-hole mounting plate, ensure that the mounting plate is level, and then drill the additional 3 holes. Once all 4 holes are drilled, install four  $\frac{5}{8}$ -11 Grade-5 bolts and secure them with the appropriate washers and nylock nuts. Repeat this mounting bracket procedure for the other side of the Railgear. Temporarily tack weld the mounting plate to the rear frame bracket. If re-adjustment is later needed, the welds may be ground off, and the rear frame bracket may be slid up or down by loosening the bolts in the slots. Also, temporarily tack the spacers into place, so that if further adjustment is necessary, the welds can easily be ground off and spacers added/removed as necessary.

**NOTE:**

Only use Grade 5 bolts on rear Railgear.

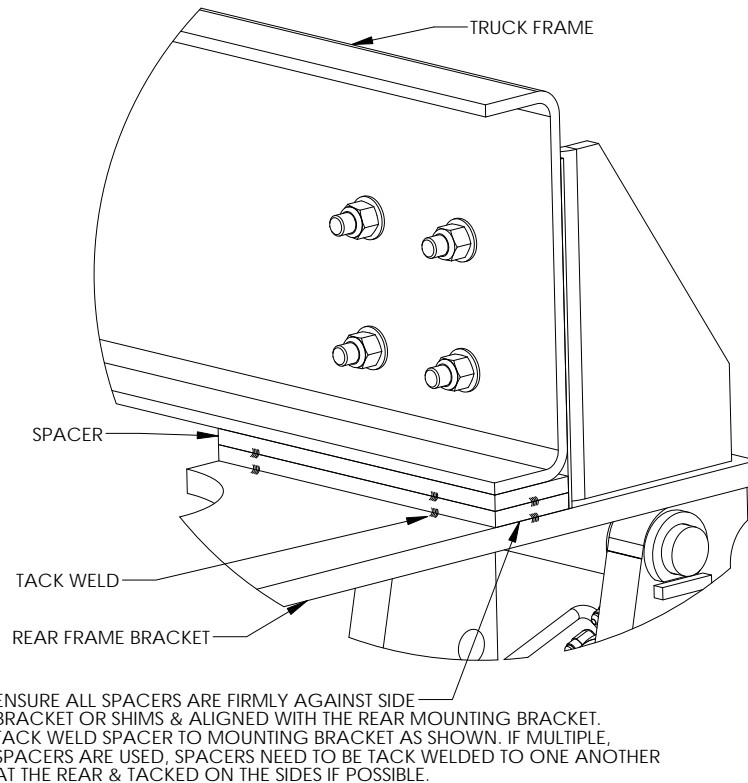
### 4.3.9 Mounting Plate Installation



ONCE THE REAR BRACKET IS CORRECTLY CENTERED, VERTICALLY POSITIONED, AND ALIGNED MEASURE 1" UP FROM THE BOTTOM OF THE SLOT IN THE REAR BRACKET SIDE PLATE, AND DRILL FIRST 5/8" HOLE THROUGH THE SHIMS (IF APPLICABLE) AND TRUCK FRAME. IF ANY SPACERS ARE INSTALLED, ADD THE TOTAL SPACER HEIGHT TO 1" DIMENSION.

**Figure 4.3.9 Mounting Plate Installation**

### 4.3.10 Tack Welding of Spacer



ENSURE ALL SPACERS ARE FIRMLY AGAINST SIDE BRACKET OR SHIMS & ALIGNED WITH THE REAR MOUNTING BRACKET. TACK WELD SPACER TO MOUNTING BRACKET AS SHOWN. IF MULTIPLE SPACERS ARE USED, SPACERS NEED TO BE TACK WELDED TO ONE ANOTHER AT THE REAR & TACKED ON THE SIDES IF POSSIBLE.

**Figure 4.3.10 Tack Welding of Spacer**

### 4.3.11 Final Rear Railgear Alignment and Weight Settings

Rear Railgear alignment and weight settings can only be performed after front Railgear is installed. The procedures for these final steps can be found in Section 4.10.

## **4.4 VARYING FRONT RAILGEAR CONFIGURATIONS**

Due to the numerous variations between chassis, DMF has designed several different mounting configurations to supply our customers with the perfect fit for their application. These configurations fall into three main categories as listed below. Each of these categories, though similar, requires varying installation procedures. Please identify which category pertains to your application and familiarize yourself with the installation procedure prior to beginning.

### **4.4.1 Traditional Long Arm Assembly**

- This style of assembly is the most common and attaches to the front axle by way of a bracket attached to the leaf springs and to the chassis frame with a stationary pin. This design allows the front rail wheels to ride on the chassis suspension alleviating vibration from track irregularities.

### **4.4.2 Cargo Arm Assembly**

- This style of assembly is normally used when chassis components (such as a low-hanging radiator or steering components) prohibit the use of the traditional long arm configuration. It is attached to the chassis by way of brackets on the front leaf springs.

### **4.4.3 Mid-Mount Assembly**

- This style of assembly is mounted either under or behind the chassis cab and is often used to meet strict curvature requirements. For more information on Mid-Mount Assemblies, please see Section 4.8 and 4.9.

## 4.5 TRADITIONAL LONG ARM ASSEMBLY INSTALLATION

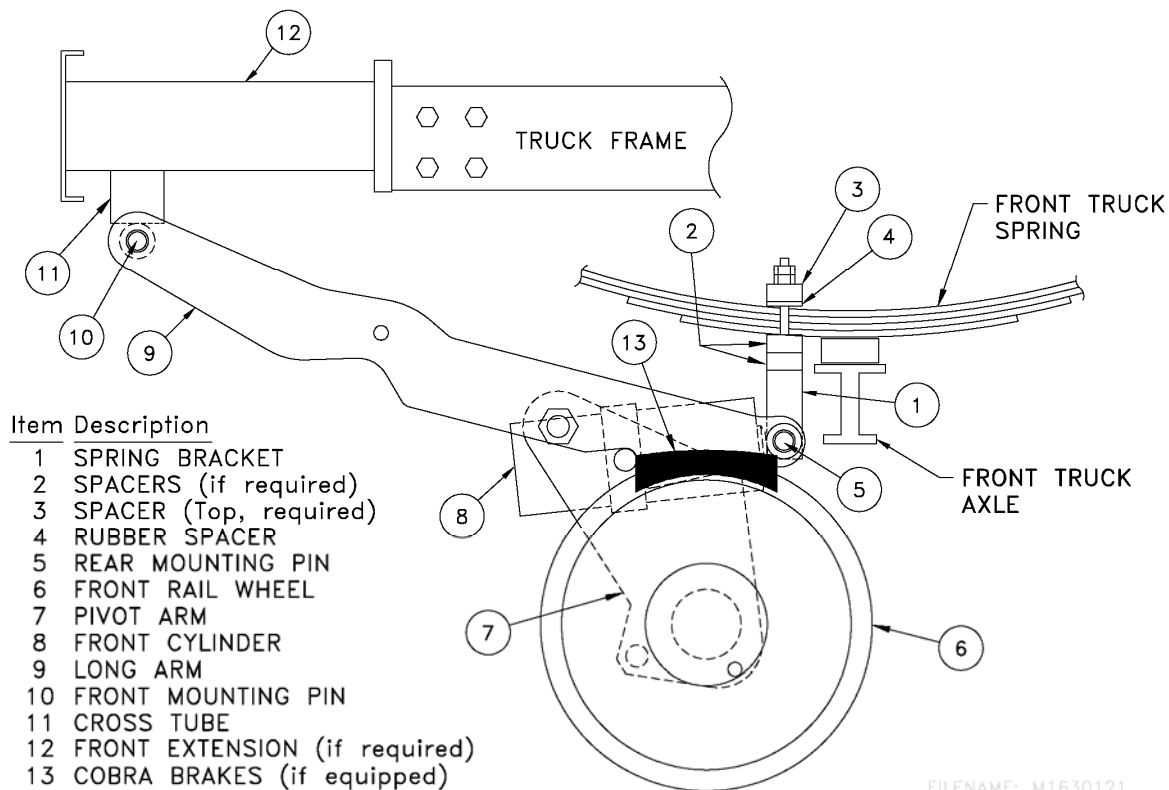
### 4.5.1 General Information

There are several items to note before you begin the installation of the front Railgear:

- The Railgear unit that we have shipped to you has been designed for your specific truck. However, before starting the front Railgear installation, check the vehicle's front tire spacing. The front Railgear operates between the front steering tires; therefore, you must have a minimum of 65" between the tires. If this is not the case, contact DMF.
- Check to see if Frame Extensions are needed. As seen in section 8.3, measure your long arm from front to rear mounting pin hole to determine dimension between holes. Starting from approximate installed location of rear mounting pin on figure 4.5.5, extend a tape measure to the length found in dimension between holes. Raise end of tape measure up toward truck frame – if you contact suitable mounting location, no frame extensions should be needed. If the end of the tape measure is beyond the front of the truck frame, then front frame extensions are likely required. Please contact DMF if you have any questions or for ordering information. Also, see section 4.5.3 for Frame Extension installation instructions.
- Check for sufficient clearances to prevent interference with Railgear and other parts of the truck (ie. Frame, steering boxes, shocks, oil filters, etc.) See section 4.5.7 for complete Clearance Note. If notable clearance issues are found, please contact DMF prior to continuing installation.

### 4.5.2 Diagram of Key Components

Figure 4.5.2 shows the individual parts of the installed front Railgear. Please familiarize yourself with these item descriptions as they will be used throughout this installation manual.

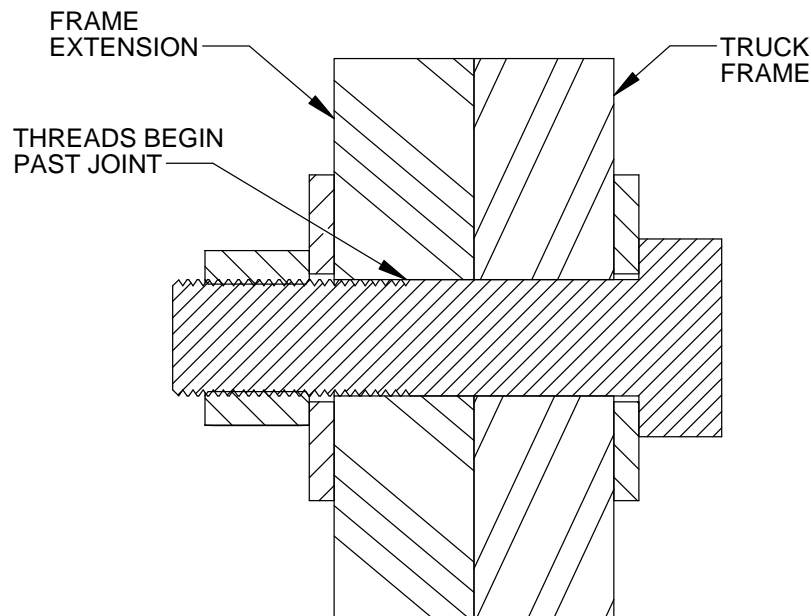


**Figure 4.5.2** Diagram of Key Components

### 4.5.3 Frame Extension Installation

Remove the truck's front bumper. If frame extensions are not required, please skip forward to section 4.5.4.

Bolt the Frame Extension to the truck frame (refer to Figure 4.5.5). Make sure that the tilt of the cab's hood will clear the Frame Extensions. Trim the brackets and re-gusset them if necessary. All truck Frame Extensions that are bolt-on brackets must use 5/8"-18 Gr. 8 or stronger bolts, hardened steel washers and Gr. 8 prevailing torque locknuts. All of the fasteners should be tightened to torque specs in section 4.1.4. When choosing bolts, make sure to use a bolt which has threads that begin past the joint seam. See Figure 4.5.3 for an illustration. Check that the Frame Extension tubes are level front to rear and side to side with the frame.



**Figure 4.5.3 Bolted Joint Cross Section**

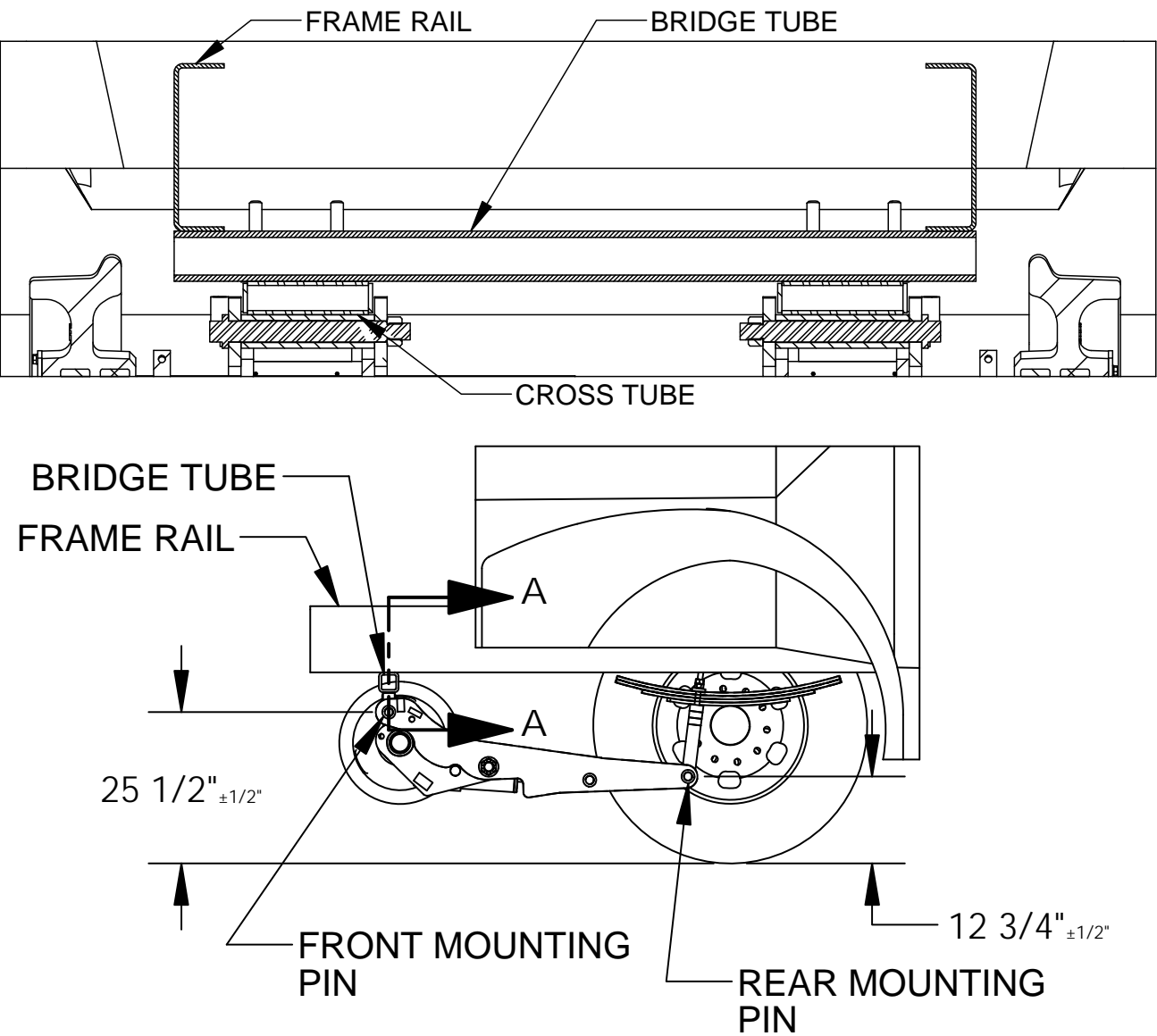
**NOTE:**

DMF front frame extensions are designed to support the Railgear only. It is the installer's responsibility to properly engineer brackets for rail racks, boom rests and etc.

In normal applications, mount the Front Valve Plate Assembly between the Frame Extensions (with the Front Valve on the underside and the handle facing forward) and weld in place. If this is not possible, mount Valve Assembly in the most appropriate and easily accessible location.

### 4.5.4 Bridge Kit Information

In some instances, the frame rails are wider than normal to clear vehicle components such as the radiator. When this occurs, the frame rail is too wide and the cross tube falls in between the frame rails and a bridge kit is needed. There are two different types of bridge kits: below frame rails (Figure 4.5.4.A) and between frame rails (Figure 4.5.4.B). If the correct front mounting pin height can be achieved with a heavy walled square tube below the frame rail as shown in Figure 4.5.4.A, that is recommended. However, if the correct front mounting pin height cannot be achieved because the below frame rail bridge will cause the front mounting pin to be too low, it is recommended to use a between the frame rail bridge with gussets (Figure 4.5.4.B).



**Figure 4.5.4.A** Below Frame Rail Bridge Kit



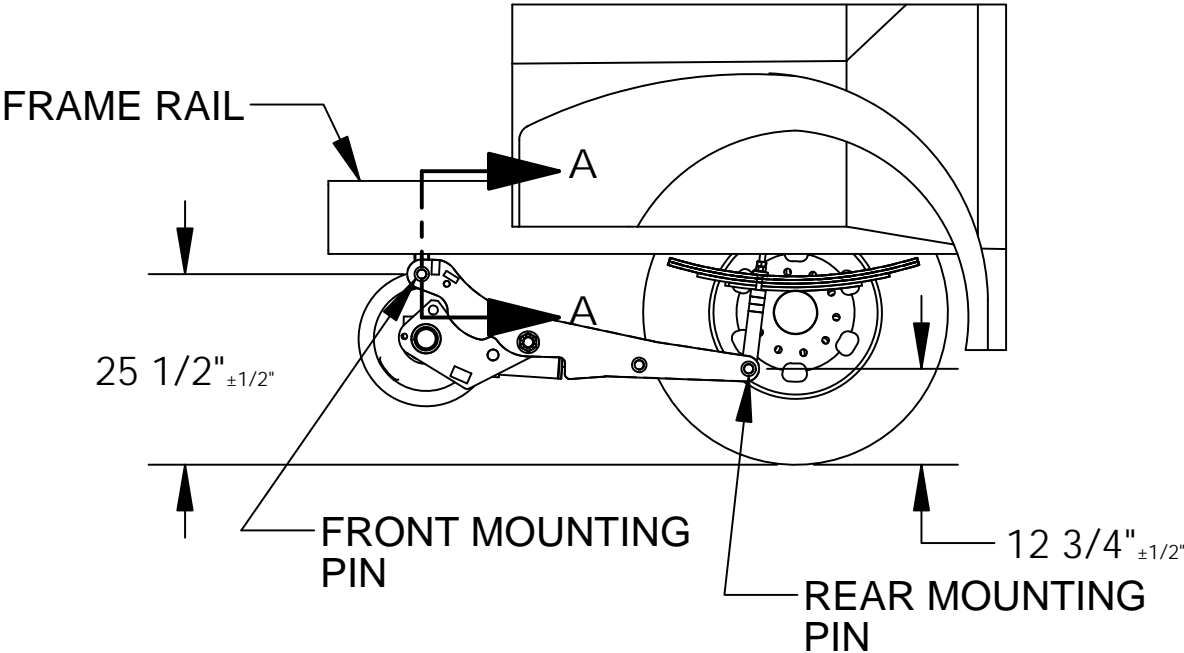
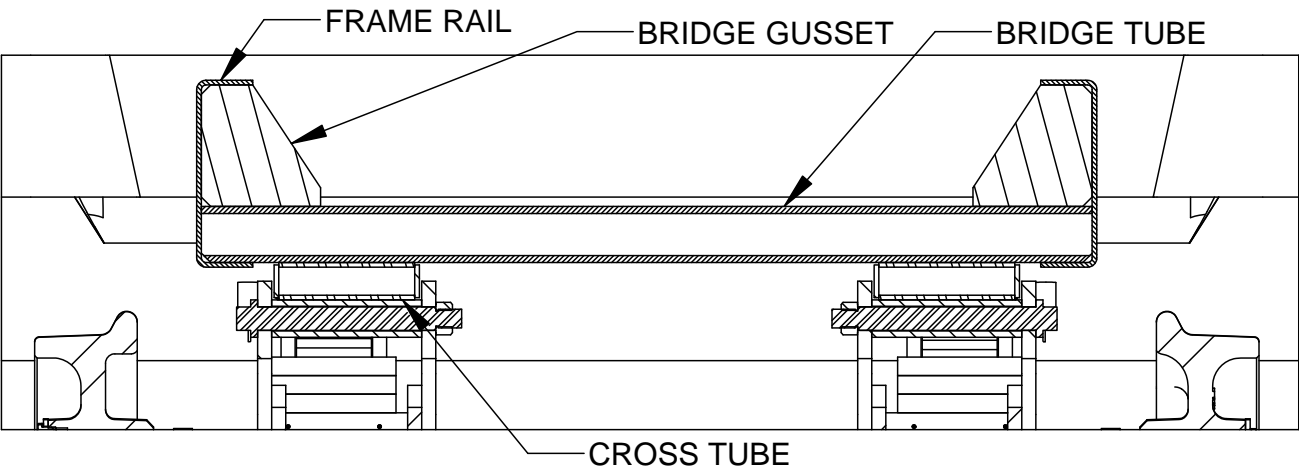
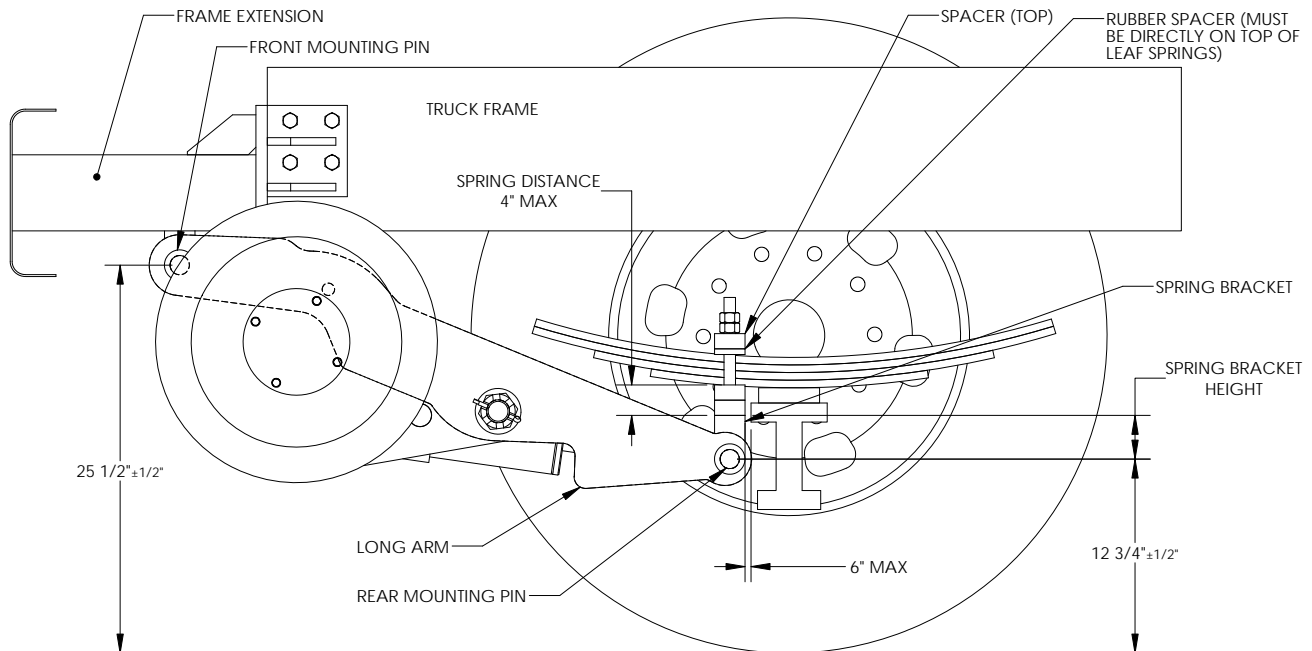


Figure 4.5.4.B Between Frame Rail Bridge Kit

### 4.5.5 Front Mounting Dimensions



**Figure 4.5.5** Front Mounting Dimensions

**NOTE:**

If the vehicle has been supplied with an integral extended front frame, the Frame Extension will not be required. The cross tubes can be brought up to the extended frame as shown in Figure 4.5.5. Follow all instructions for finding the Front Mounting Pin height with the Frame Extensions. Solid or load bearing Spacers may be required between the cross tubes & the bottom of the frame to obtain the desired 25-1/2" from ground to Front Mounting Pin.

### 4.5.6 Mount Front Railgear

Mounting spring bracket hangers:

1. Remove the truck's front bumper.
2. Slide the front Railgear under the truck frame, positioning the spring bracket hangers as close as possible to the front truck axle. Make sure at least half of the spacer is seated on the leaf spring closest to the front truck axle. If the spacer is not at least half-seated, move spring bracket hanger forward to next leaf spring. The spring hanger can be moved 6" max from front truck axle.
3. Once positioned, place a floor jack under the outboard and inboard long arm, close to the spring hanger on the driver's side. Using the jack, raise the spring hanger up toward the truck's leaf springs. You will raise and lower the long arms until the "Rear Mounting Pin" is 12-3/4" (+/- 1/2") from the floor. See figure 4.5.5.
4. Once you achieve the desired height, insert 1"x2" flat bar spacers between spring hanger and leaf spring, up to a maximum of 4". If you need more than 4" of spacers, a change of spring brackets may be required (see section 8.0 for spring bracket information). Contact DMF for assistance.
5. Once spacers are in place with spring bracket at the appropriate height, attach the Spring Bracket to the truck spring using a Rubber Spacer (already supplied) directly on top of the leaf springs, and then a 1" x 2" flat bar Spacer (already supplied) on top of the Rubber Spacer and two 3/4"-10 hex nuts per stud. The top Spacer has no effect on the height of the Railgear and is only used for clamping purposes.

6. The nuts should be tightened down until the Rubber Spacer begins to deform from the downward pressure (**Caution: Do not over tighten**).
7. Repeat process on passenger side.

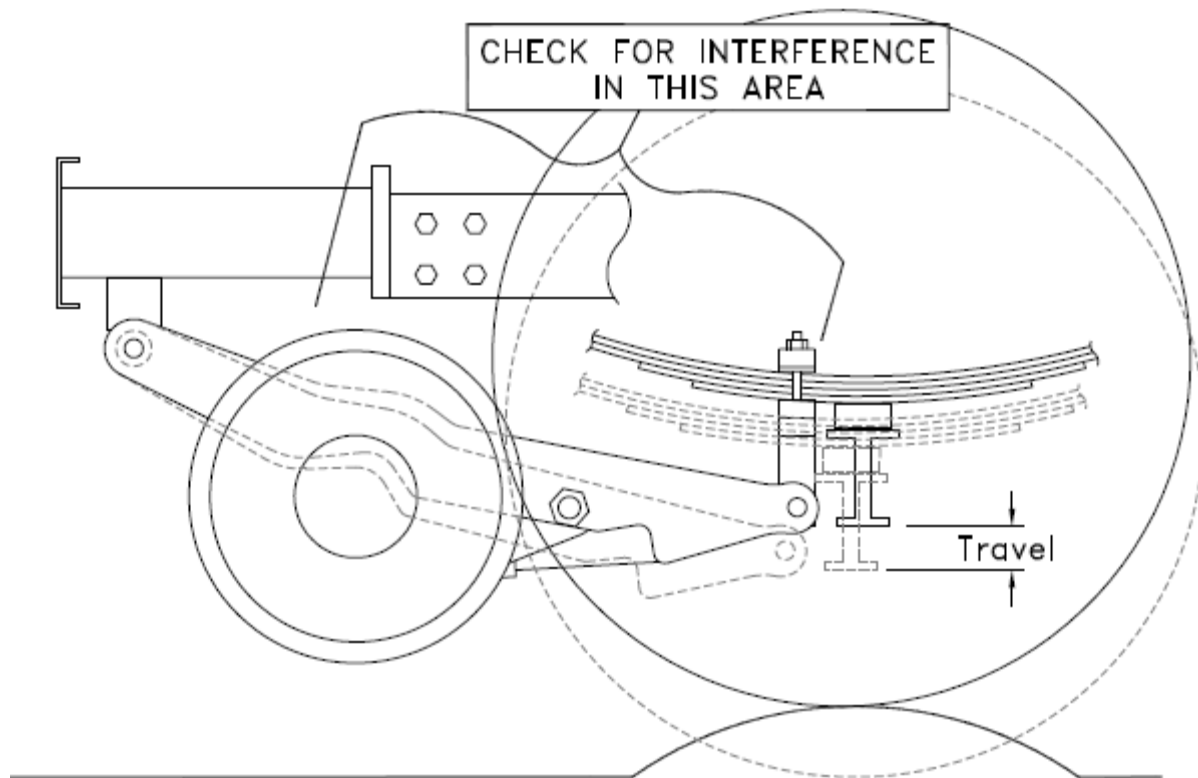
#### Route Hydraulic lines

1. Route all hydraulic lines as shown in Section 6.0.
2. Engage the PTO and allow hydraulic circuit to self-bleed.
3. Inspect all connections for leaks and tighten as necessary.

#### Mounting Front Cross Tubes:

1. Ensure that both spring bracket hangers are properly installed before attempting to install front cross tubes.
2. Remove the Front Pin-Offs and set the steering tires straight ahead. The front Railgear can now be actuated with the hydraulic system, which will cause the Long Arms to be raised up to the Frame (see Figure 4.5.5). The cross tubes only need to be brought up to where they touch the Frame Extension or truck frame (not raised all the way to lift the truck frame and raise the truck tires).
3. In order to install the front of the front Railgear at the correct height, the center of the Front Mounting Pins must be located at 25-1/2" (+/- 1/2") from the ground (with the truck tires on the ground) as shown in Figure 4.5.5. If required, shim the cross tubes to obtain this 25-1/2". Any shims used should be load bearing members (no thin wall tubing). If necessary, a different cross tube can be used to obtain the desired height of the Front Mounting Pin, up to a maximum of 3" of shims. If you need more than 3" of shims, a change of cross tubes / mounting block may be required (see section 8.0 for information). Contact DMF for assistance.
4. Once properly shimmed, the hydraulic system should already be properly positioned to hold the shims in place until alignment can be completed.
5. Check for truck frame, spring, steering gear or other truck component interference with the Railgear (particularly the Long Arms – see CLEARANCE NOTE in section 4.5.7). Front Mounting Pin ground clearance may be reduced to as low as 24" to provide for proper fit.
6. Repeat process on passenger side.

#### 4.5.7 Front Railgear Clearance



**Figure 4.5.7** Front Railgear Clearance

**CLEARANCE NOTE:**

Proper clearances will allow the Railgear to move up and down with the truck front suspension. As the truck tire hits bumps in the road, the truck spring allows the front axle to move upward (see Figure 4.5.7). Since the Railgear is attached to the spring just in front of the axle, sufficient clearance must be allowed to prevent interference with other parts on the truck (i.e. frame, steering boxes, shocks, oil filters, spring hangers, hydraulic lines, etc.). The Front Mounting Pin does not move in relation to the vehicle frame because it is fastened through the Frame Extension (or directly to the truck frame). As the Front Mounting Pin does not move and the Rear Mounting Pin (at the axle) does, the Railgear effectively rotates about the Front Mounting Pin. Therefore, the part of the Railgear near the Rear Mounting Pin moves more than the part near the Front Mounting Pin, and attention needs to be paid to the possible clearance problems that can be caused by this movement.

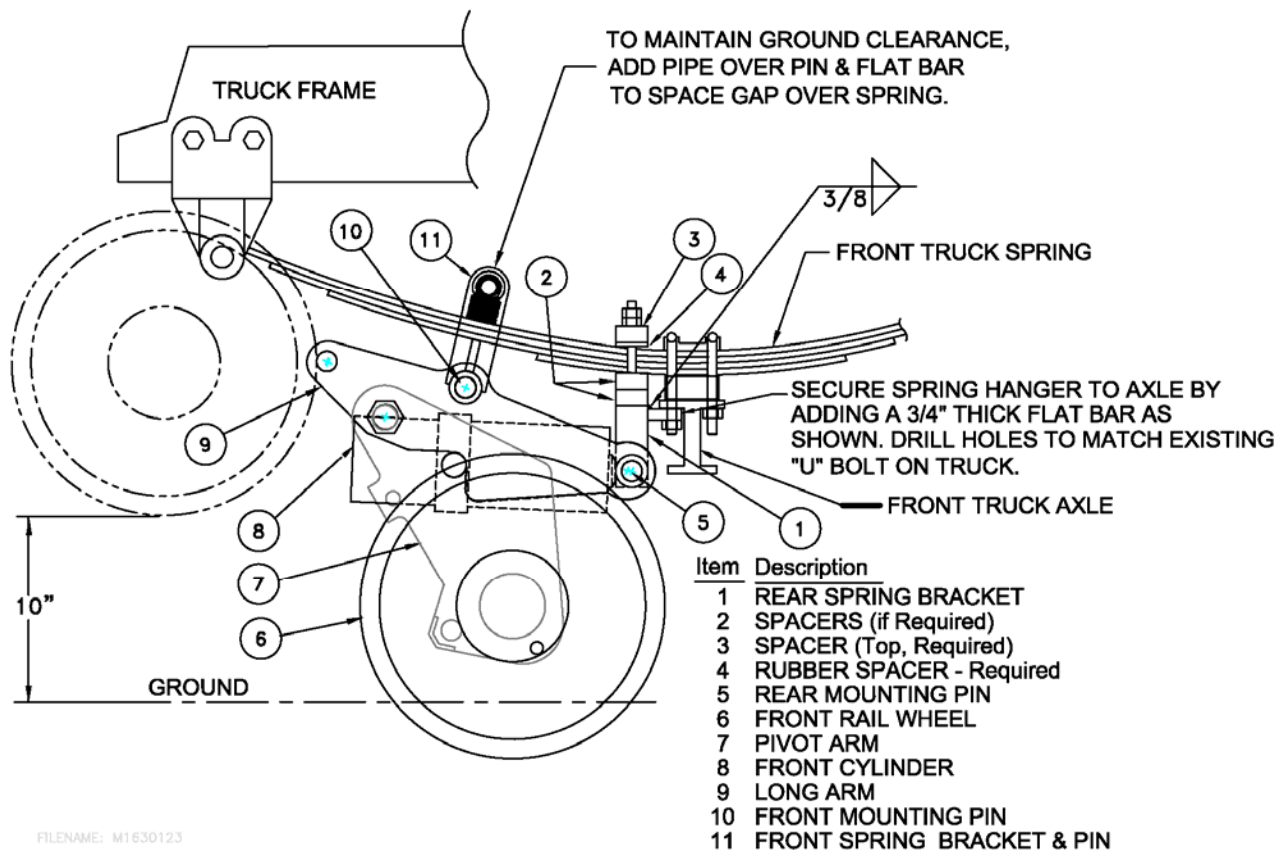
## 4.6 CARGO ARM FRONT ASSEMBLY INSTALLATION

### 4.6.1 Front Cargo Arms

In some applications, the front Railgear long arms that extend beyond the front of the truck to frame extensions cannot be used due to possible interference with other truck components. If this is the case, DMF supplies a front Railgear unit that includes much shorter long arms (Referred to as Cargo Arms). With some modifications that will be detailed further, the rear of the arms mount to the truck springs in the same manner as a standard set of long arms while the front of the arms mounts further forward on the leaf springs thus utilizing the suspension of the chassis.

### 4.6.2 Diagram of Key Components / Front Mounting Dimensions

Figure 4.6.2 shows the individual parts of the installed front Railgear. Please familiarize yourself with these item descriptions as they will be used throughout this installation manual.



**Figure 4.6.2** Diagram of Key Components/Front Mounting Dimensions

### 4.6.3 Mount Front Railgear

Mounting Rear Spring Bracket:

1. Remove the truck's front bumper.
2. Slide the front Railgear under the truck frame, positioning the spring bracket hangers as close as possible to the front truck axle. Make sure at least half of the spacer is seated on the leaf spring closest to the front truck axle. If the spacer is not at least half-seated, move spring bracket hanger forward to next leaf spring. The spring hanger can be moved 6" max from front truck axle.

3. Once positioned, place a floor jack under the outboard and inboard long arm, close to the spring hanger on the driver's side. Using the jack, raise the spring hanger up toward the truck's leaf springs. You will raise and lower the long arms until the "Rear Mounting Pin" is 12-3/4" (+/- 1/2") from the floor. See figure 4.5.5.
4. Once you achieve the desired height, insert 1"x2" flat bar spacers between spring hanger and leaf spring, up to a maximum of 4". If you need more than 4" of spacers, a change of spring brackets may be required (see section 8.0 for spring bracket information). Contact DMF for assistance.
5. Once spacers are in place with spring bracket at the appropriate height, attach the Spring Bracket to the truck spring using a Rubber Spacer (already supplied) directly on top of the leaf springs, and then a 1" x 2" flat bar Spacer (already supplied) on top of the Rubber Spacer and two 3/4"-10 hex nuts per stud. The top Spacer has no effect on the height of the Railgear and is only used for clamping purposes.
6. The nuts should be tightened down until the Rubber Spacer begins to deform from the downward pressure (**Caution: Do not over tighten**).
7. Repeat process on passenger side ensuring that the back of spring hanger to front of axle web dimensions are equal on both sides.

#### Route and Attach Hydraulics:

4. Route all hydraulic lines as shown in Section 6.0.
5. Engage the PTO and allow hydraulic circuit to self-bleed.
6. Inspect all connections for leaks and tighten as necessary.

#### Mounting Front Spring Bracket:

1. Ensure that both spring bracket hangers are properly installed before attempting to install front spring bracket.
2. Ensure that the safety pin-off pins are in the highway position. Then place a floor jack under the center of the Railgear axle. Using the jack, raise the Railgear up toward the truck's leaf springs paying close attention to clearances to prevent damaging chassis components. Raise the axle until a 10" (minimum 8") ground clearance is achieved at the rail wheel flange.

#### NOTE:

If the required ground clearance cannot be achieved, the front truck axle may have to be blocked down to provide additional clearance. Have this work performed by a professional axle shop that can ensure these changes will not produce unsafe steering geometry or other problems for the vehicle.

3. After achieving proper ground clearance, swing the front spring bracket into position normal to the front leaf springs and insert the upper pin.
4. Weld spacers onto the front spring bracket above or below the leaf springs as shown in figure 4.6.2. This will restrict the amount of vertical travel while still allowing fore and aft travel as the suspension flexes.
5. Ensure that the safety pin-off pins are removed and actuate the Railgear through its full range of motion to check that there is proper clearance.
6. Since the front mounting bracket is no longer pinned to a fixed point on the truck frame, a permanent attachment is to be made at the truck axle (see figure 4.6.2). The width of the flat bar depends on the distance between the rear spring hanger and the web of the truck axle "I" beam. The flat bar is to be welded securely to the spring hanger and attached to the axle "U" bolt as shown.

## 4.7 COMPLETING FRONT INSTALLATION

### 4.7.1 Align Front Railgear

The front Railgear now is ready to be squared up and aligned. Three measurements need to be taken to ensure that everything is aligned properly.

To align the Long Arms, check:

- (1) That they are parallel with each other and the truck frame.

The outside Long Arms should be the same distance apart at the Rear Mounting Pin as they are at the Front Mounting Pin. This prevents the mechanism from binding during up/down operation of the Railgear. Also the distance from the Long Arms to the truck frame should be the same on each side.

- (2) That they are the same distance forward.

Measure the distance from the Front Mounting Pin to a common point in the truck frame. If the measurements are off, square the Railgear by loosening the nuts on one spring hanger and moving forward on the truck spring and re-tighten.

To check the Spring Bracket location, check:

- (3) That the Spring Bracket to truck axle distance is same on both sides.

Measure the distance from each Spring Bracket back to the truck axle. Since the forward position of the Long Arms has been verified (Check #2), an off measurement here probably means the front truck axle is misaligned and needs to be corrected.

After these alignment checks and after ensuring there are sufficient clearances, the Frame Mounting Brackets can be tack welded to the Frame Extensions.

**NOTE:**

Do not attach the welding machine ground clamp onto the Rail Wheels. This will cause arcing across the bearings inside the wheels and lead to premature bearing failure.

Raise the front Rail Wheels just above the floor, enough to slide the front Installation Rails into place under the Rail Wheels. Because the Railgear Axle assembly is not fixed to the Pivot Arms (outside pivot arms will be completely welded to at final weld-out), the Rail Wheels need to be centered. To center, measure the distance from the inside of the Rail Wheel to the truck frame. If the measurements are off, slide the Rail Wheels and Axle assembly to one side (the Axle Tube will slide through the holes in the Pivot Arms).

Depending on the brake configuration used, the Axle Tube will need to be rotated in order to locate front Railgear components in the right position. The possible configurations are:

Without Brakes:

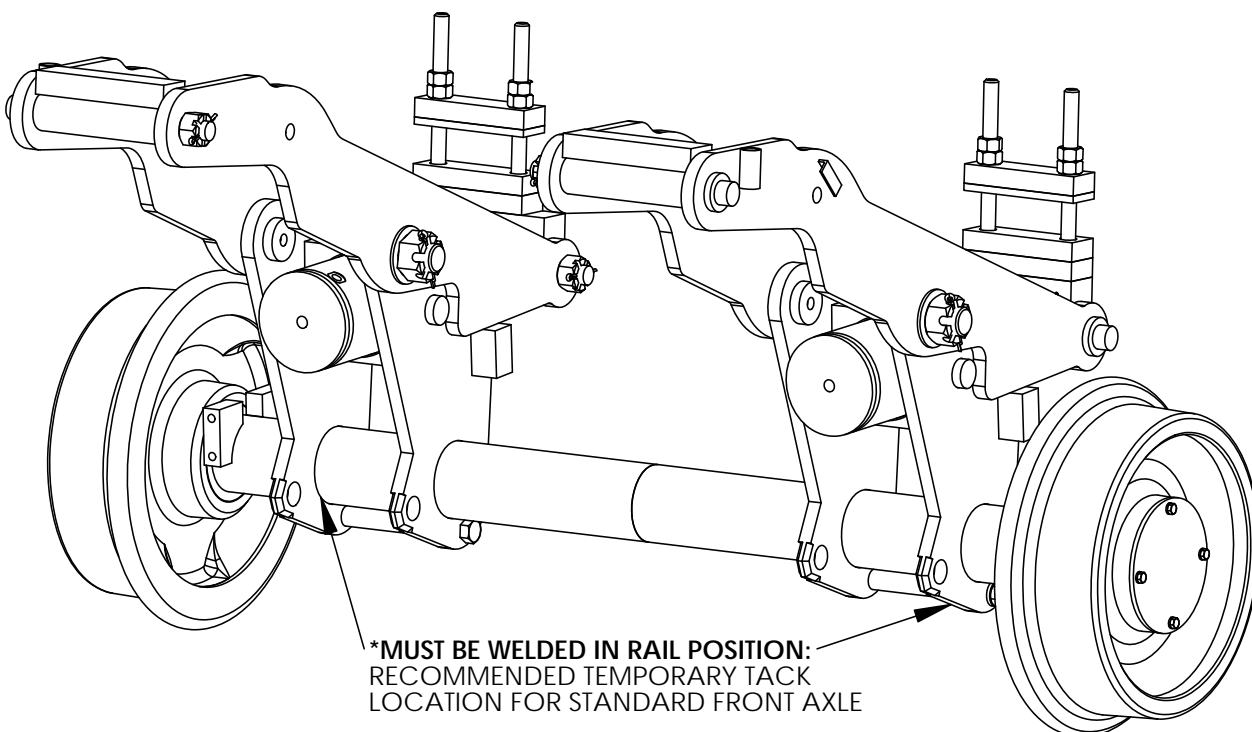
If the Railgear is not supplied with any brakes, the Steering Wheel Locks must be aligned. When the front Railgear is in the rail position, these Steering Wheel Locks prevent the front truck wheels from interfering with the Railgear operation.

With Cobra Brakes:

If the Railgear is supplied with Cobra Brakes (factory-installed), then they need to be rotated around so that they are oriented in the correct position (see Section 5.3.1). For the rest of the brake installation, see Section 5.3.

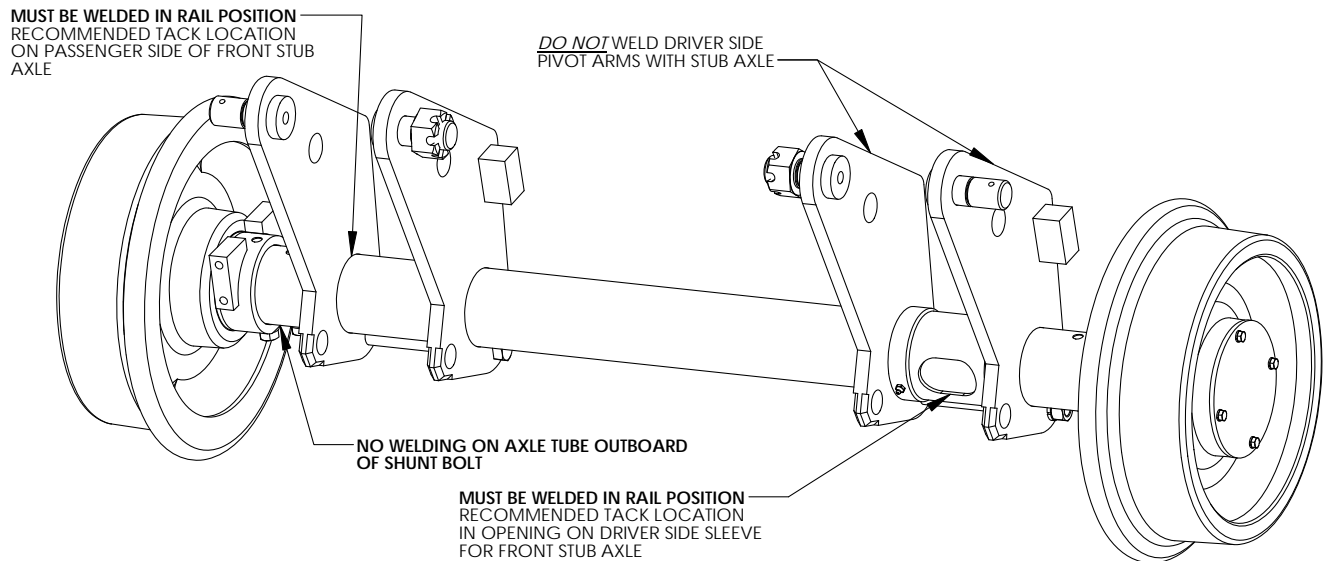
With the Axle Tubes now centered and brake configuration determined, the Axle Tubes should be temporarily tacked (at final adjustment, the tacks can be ground off and the axle re-

adjusted if necessary). See figures 4.7.1.A and 4.7.1.B for diagram of recommended tack locations for standard and stub axle. The front Railgear is ready to be lowered on the Installation Rails. As the Railgear is lowered, check the clearance from the truck tire to the Rail Wheels. (If there is any interference, stop lowering the wheels, and retrace the installation steps to fix the problem.) When the Railgear is completely lowered, the front truck tires should be approximately 2 inches above the Installation Rails. If Railgear will not lift the truck, check that the cylinders are not cross plumbed, that the system pressure relief valve (if present) is set high enough and that the pressure relief on the Front Railgear Valve is set high enough. As a final review, recheck the center alignment of the Rail Wheels to the truck frame. (If it is off, break the tacks holding the Axle Tube and slide the Axle Tube to the correct position and re-tack in place.)



**Figure 4.7.1.A** Recommended Tack Location for Standard Front Axle





**Figure 4.7.1.B** Recommended Tack Location for Front Stub Axle

#### 4.7.2 Final Steps

If the Spring Bracket location had to be adjusted, make sure that the hex nuts (two per stud) on both Spring Brackets have been tightened down. Then with a torch, cut the excess stud length on the Spring Brackets. If these studs are not trimmed down, they may pose a clearance problem with other parts on the truck (see CLEARANCE NOTE and Figure 4.5.7).

**NOTE:**

Remount the truck front bumper or use 8" standard channel welded onto the ends of the Frame Extensions.

## 4.8 UNDER CAB FRONT UNIT INSTALLATION

Part Drawings are available in Section 8.0.

### NOTE:

Two factors control the installation of the Under-cab front unit:

- A) Fuel Tanks, and
- B) Motor, Transmission, PTO Arrangement.

Read Section 4.8.1 before dismantling any equipment.

### 4.8.1 Under Cab General Information

#### FUEL TANKS:

1. Are cab steps part of the tank or tank brackets? You can either leave tanks in location or relocate tanks and add new Under Cab steps.
2. Can tanks be relocated? Do you have room down the frame?
3. What is the Ground Clearance under tanks? You need a minimum of 13-1/4" under tank and/or tank brackets to maintain an 11" Rail wheel G.C. in Highway mode. This can be reduced for fitting under lower tanks; but you must contact DMF. Another option would be to reinstall the tanks higher during re-assembly. Is there room to move the tanks higher?
4. Do you have squared or cylindrical tanks? This affects Rail wheel clearance between the bottom corner of the tank as it is deployed into the rail position.
  - a. For cylindrical tanks (nominally 26" dia) spaced 2" from frame: Mount the back edge of the frame mounting bracket behind and no closer than 3" from back edge of 13-1/4" G.C. tank

1-1/2"	14"
5/8"	15"
3/16"	16"

**Table 4.8.1.A** Cylindrical Tank Spacing

- b. For squared (step) tanks, mount the back edge of the frame mounting bracket behind and no closer than 5" from the back edge of 13-1/4" G.C. tank

2-7/8"	14"
1-5/8"	15"
3/4"	16"

**Table 4.8.1.B** Squared Tank Spacing

- c. The Railgear may be located further rearward than allowed above; but, you must contact DMF.
5. The rail axle requires 24" of ground clearance to stow under the truck drive shaft. The rail axle will stow 10-1/2" behind the back edge of the mounting bracket.
6. Mark the location of the back of the frame mounting bracket (on both sides) as described above. Measure forward from these marks 31-1/4" (bracket length) and mark frames again.

#### MOTOR, TRANSMISSION, PTO ARRANGEMENT:

The mounting shelf of each frame mounting bracket is 9" wide. The inboard side of the frame mounting brackets can be spaced out to a maximum clearance of 41-3/8". The Railgear is designed to fit a truck frame with as little as 29" G.C.

1. Measure from ground to 29" height between the frame marks on each side. Determine what machinery (probably transmission) or plumbing is closest to the outside of the

- frame along this horizontal 29" plane. Measure on each side to determine what the closest distance is to the outside of the frame.
2. If the nearest obstruction is more than 9" from the frame, proceed to step 5. And use the truck frame width.
  3. Subtract the closest distance from the 9" shelf width. This is how far you would space the frame mounting bracket out on that side to clear the obstruction.
  4. Add to the frame width (of the truck) twice the distance you figured for step 3. This will space both sides out equally.
  5. Is the distance from step 2 or step 4 less than 41-3/8"? If not can you move Railgear to clear the obstruction? Consult with DMF.
  6. The spacer distance found in step 3 will be added to the inboard side of each frame mounting bracket. These spacers should be flat bar welded to the frame mounting bracket at each of the (4) vertical slots on each bracket. Later you will drill through the slots, spacers, and truck frame to attach each bracket to the frame.
  7. Measure from the ground to under the truck frame between the frame marks. Subtract 29" from this measurement. This is the amount of solid spacer (flat bar only) to be welded to each frame mounting bracket shelf. This sets the bracket shelf at 29" when installed.

#### **4.8.2 Dismantle**

Now that you have determined where the Under Cab Railgear will install, strip the truck frame in the area between the frame marks. After the Railgear mounting brackets have been installed onto the frame mounted truck equipment (tanks, air dryers, etc.) may be remounted over the Railgear mounts or they may be relocated further down the truck frame.

#### **4.8.3 Mounting**

The Railgear frame mounting brackets attach to the truck frame using (8) 5/8"-11 grade 5 bolts on each side. These bolts use the same 4-hole mounting plates as used on the rear equipment installation. After bolting the mounting brackets to the truck frame, the 4-hole plates should be temporarily tack welded to the frame mounting brackets to prevent them from slipping, and to allow for further adjustment during overall alignment (by grinding off tack welds). Final welding of these plates will be performed in Section 4.12.

#### **4.8.4 Axle Adjustment**

The rail axle may now be centered under the truck frame by sliding it transversely in the lower arm weldments. Follow the established procedure for aligning Standard Front Railgear – see Section 4.7. After centering the rail axle, rotate the axle tubes to align the front brake assemblies with the arm weldments. In the rail position the brakes should be located behind the guidewheels and about 15 degrees up from horizontal. In the highway position the brake assemblies should be located above the stowed guidewheel and rotated forward by about fifteen degrees.

#### **4.8.5 Welding**

Once the brake and axle positions have been determined, you must weld the axle tubes to the lower arm weldments. This may be done on the inboard sides of the lower arms. Follow the established procedure for welding the axle tubes to the pivot arms found in Sections 4.7 and 4.12.

#### **4.8.6 Remote Air Pin-Off Installation**

The positions for the upper and lower pin-offs are located on the inside of each upper arm assembly. Due to inaccessibility, operation of the pin-offs is achieved from a remote location, preferably on or near the driver's side of the truck frame. The DMF furnished remote pin-off assemblies are air operated and include lock pin housings, air control valve, cylinders and pre-set proximity sensors with LED position indicators. A legend plate, DMF #818754, is also furnished to locate and install the air control valve and LEDs. This plate, when installed with the LEDs indicates engagement or dis-engagement of the lock pins. Please refer to the enclosed drawing #818745 for installation instructions of the pin-off assembly.

See Drawing on Next Page.

#### **4.8.7 Completion**

Finish installing rear Railgear, options, hydraulic system, etc. as per the standard Railgear installation instructions.

# REMOTE AIR PIN-OFF OPERATION

PIN ENGAGE  
RED LIGHT

PUSH TO  
ENGAGE

PIN DIS-ENGAGE  
GREEN LIGHT

D/S

P/S

PULL TO  
DIS-ENGAGE

D/S

P/S

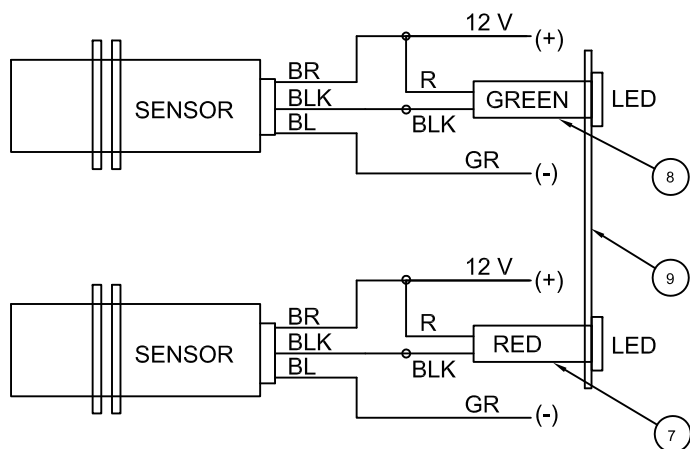
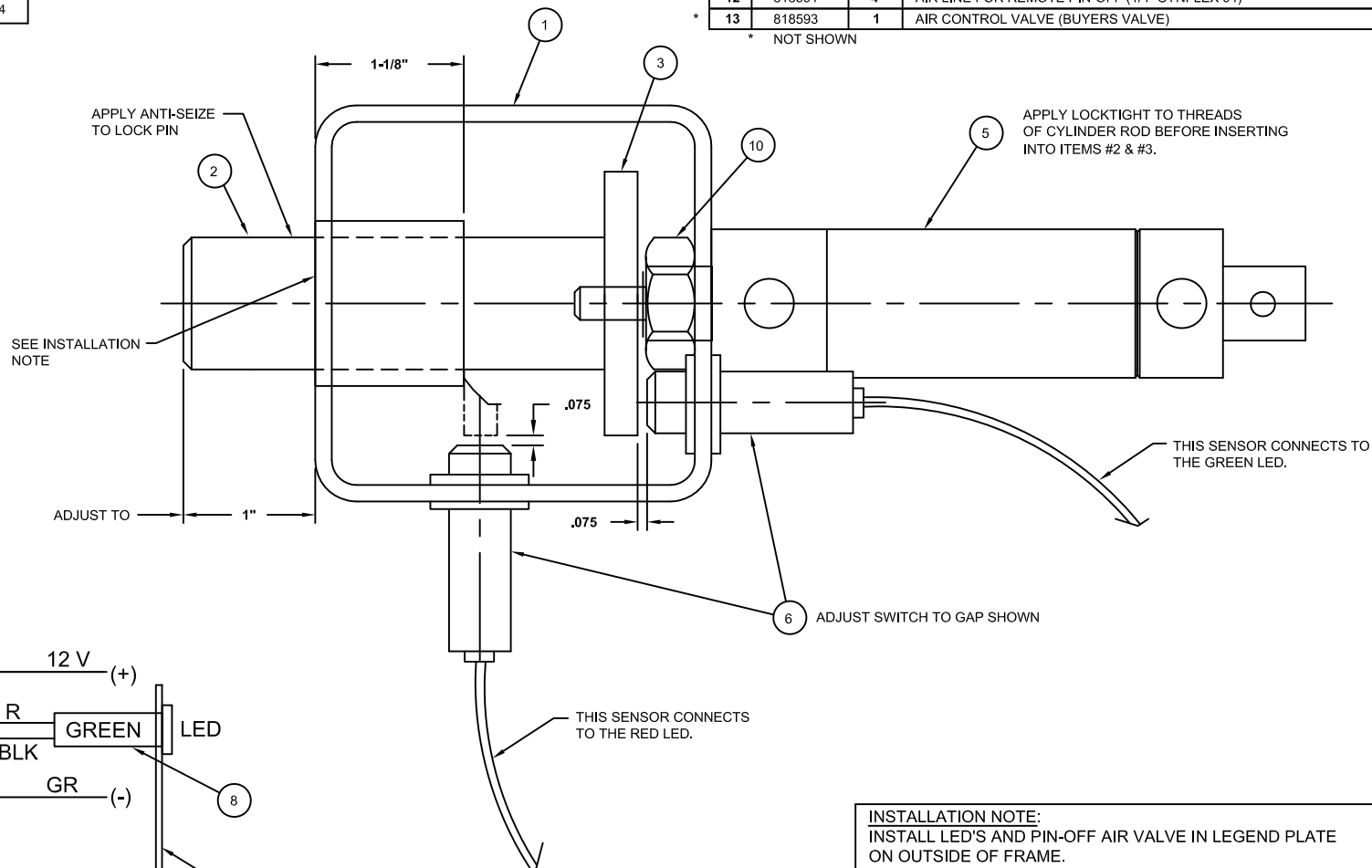
818754



FRONT VIEW OF LEGEND PLATE

ITEM	PART NO.	QTY	DESCRIPTION
1	818743	2	HOUSING WELDMENT, AIR PIN-OFF
2	818747	2	PIN-OFF PIN (1"Ø)
3	818748	2	TRAVEL STOP & JAM NUT (CRR 2"Ø)
4			
5	818755	2	AIR CYLINDER (1-1/16" BORE x 1" STROKE)
6	818751	4	PROXIMITY SWITCH (NNB2-12GM50EO)
7	818752	2	RED LED
8	818753	2	GREEN LED
9	818754	1	LEGEND PLATE
10	818596	2	JAM NUT (5/8"-18)
* 11	818587	7	AIR PIN-OFF FITTINGS (269PMT-4-2) (1869x4S)
* 12	818591	4	AIR LINE FOR REMOTE PIN-OFF (1/4" SYNPLEX 04)
* 13	818593	1	AIR CONTROL VALVE (BUYERS VALVE)




\* NOT SHOWN



WIRING DIAGRAM (TYP. EACH SIDE)

NOTE: EACH SIDE MUST BE INDEPENDENT OF THE OTHER IN ORDER TO FUNCTION PROPERLY. (DO NOT WIRE IN SERIES.)

INSTALLATION NOTE:  
INSTALL LED'S AND PIN-OFF AIR VALVE IN LEGEND PLATE ON OUTSIDE OF FRAME.  
WELDING TO RAILGEAR FRAME:  
APPLY (2) 1/2" PASSES ON EACH VERTICAL EDGE OF PIN-OFF TUBE. DO NOT WELD ACROSS TOP & BOTTOM OF TUBE.

	6/08/10	ADDED VIEW OF LEGEND PLATE #818754			JBG		
	11/20/01	ITEM #1 WAS P/N 818746 & DELETED ITEM #4 P/N 818749			WT		
REV	DATE	DESCRIPTION				BY	APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS		<div>TITLE:  RW-1630UC REMOTE AIR PIN-OFF ASSEMBLY  DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512</div>					
FRAC. MACH: ± 1/32"							
FRAC. MACH: ± 1/16"							
X ± .063							
.XX ± .030							
.XXX OR .XXXX ± .005							
DRILL SIZES: +.015		<div>DRAWN BY:      APPD BY:</div> <div>DATE:            DRAWING NUMBER:      REV:</div>					
ANGULAR: ± 1°							
SURF FINISH: 125 MICRO							
THREADS: 2A AND 2B							
BREAK SHARP EDGES ( 0.000 X 45° MAX )							
WET		10/22/01		818745		B	

## 4.9 BEHIND CAB FRONT UNIT INSTALLATION

Part Drawings are available in Section 8.0.

### NOTE:

Read through the Section 4.9.1 before dismantling any equipment and starting installation. Factors that control installation of the behind cab unit are the location of fuel tanks relative to the rear of cab and available open frame space for proper assembly.

For any questions, please contact DMF for assistance.

### 4.9.1 Behind Cab General Information

Ideally, 36" of open frame behind the cab is required for installation, including unobstructed upward movement of the brake chambers to the highway position. The leading edge of the frame mounting brackets should be as close to the rear of the cab as practical. Establish a forward point and mark the truck frame both sides. Measure from these marks 29-5/8" (bracket length) and mark the frame again both sides. This is the clear space required to mount the frame brackets if the brakes are located behind the axle. In some cases, "step side" fuel tanks on either side of the cab may need to be moved forward to achieve the desired space near the rear of the cab. It may also be necessary to re-locate tool boxes, hydraulic tanks, air tanks, etc. rearward. 31-3/4" is the minimum vertical ground clearance at the rail width needed for the brake chambers in the highway position.

The guide wheels are reversible at installation. If the wheels are insulated, it is noted that DMF installs the insulation on the driver's side wheel, which in this case, locates the brakes to the rear of the axle. Keep in mind, that even though this feature allows positioning of the brakes to the front or rear of the unit as space permits, an insulated wheel reverses to the passenger side of the truck if the brakes are in front of the axle.

### NOTE:

The rear position is desirable from the standpoint of protecting the brake assembly from obstructions in the forward travel mode.

The Railgear is designed to provide 9" of ground clearance beneath the rail wheels when the Railgear is in the highway position. Solid spacers must be welded to the frame mounting bracket shelves to achieve 9" of ground clearance when the railgear is pushed up flush to the bottom of the truck frame and the railgear is in the highway position. Be mindful of clearance required for the driveshaft or other frame mounted components when raising up the railgear.

The design width of the behind cab unit between the inboard side of the frame mounting brackets is 34-7/8". To determine the amount of space required between the truck frame and Railgear each side, measure the outside width of the truck frame and subtract that distance from 34-7/8". This amount divided by 2 will space both sides out equally. Flat-bar shims are furnished to use as spacers. If additional shims are necessary they must conform to the shape of the furnished part, except for required thickness. These shims are to be securely welded to the inside of the frame mounting brackets.

Depending on truck frame depth and vertical spacing required to achieve the proper height for 9" of ground clearance, the frame mounting brackets may protrude above the top of the truck frame by as much as 8 inches. This must be taken into consideration if the unit is installed on a flat bed truck where crossmembers span the truck width over the frame. Also, space above the frame brackets needs to be maintained in order to provide access for hydraulic hose routing to the Railgear cylinders.

### 4.9.2 Dismantle

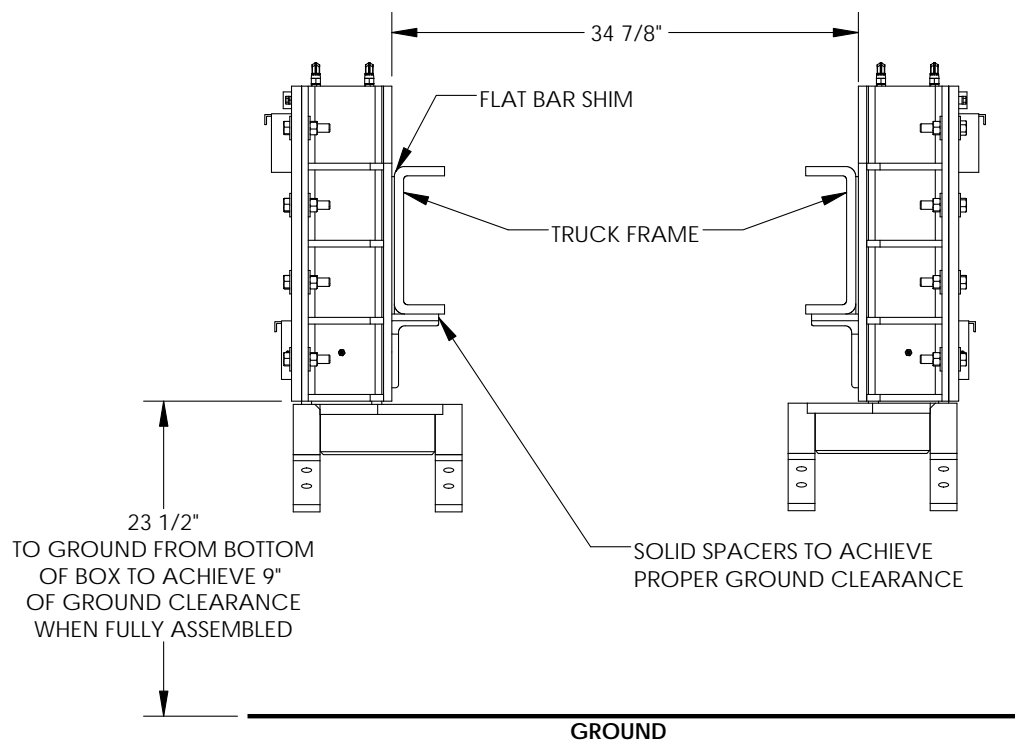
Now that it has been determined where the behind cab unit will be installed, strip the frame in the area between the frame marks. It may also be necessary to remove one or two rows of truck crossmember bolts in order for the frame brackets to fit flush against the truck frame. The Railgear attaching hardware will replace the crossmember bolts. After the Railgear has been installed, the frame mounted truck equipment may be re-mounted partially over the Railgear frame brackets or farther down the truck frame.

**NOTE:**

Accessibility to the Railgear must be maintained for pin-offs, normal maintenance and/or repairs.

### 4.9.3 Installation

The behind cab unit has been shipped disassembled for ease of installation. Using floor jacks, raise each bracket approximately 23-1/2" from the bottom of the box assembly to the ground up against the pre-determined frame location both sides, see figure 4.9.3. This should allow for the proper height of 9" of ground clearance. Clamp the brackets securely to the truck, while allowing access for a frame drill and platform. Align the boxes to be square with the frame as well as each other. Once aligned, drill a minimum of six 5/8" diameter holes in a balanced pattern through each bracket assembly and frame member (and cross member gusset where applicable). Attach each frame bracket assembly to the truck with 5/8-11 "Grade 8" bolts and 5/8-11 Type "C" lock nuts.



**Figure 4.9.3** Behind Cab Installation Height

The lower axle assembly, complete with wheels and brakes, is the remaining mechanical portion of the unit to be installed. Position the 4 elastomer springs in their lower seats. With the 4 lower axle straps removed, raise the assembly up to the upper spring seats. Install the 4 bolts through the springs and secure nylock nuts. Next, install the 4 axle straps and secure with the sixteen 5/8-11 bolts and lock washers.

#### **4.9.4 Completion**

Provided the frame brackets of the behind cab unit are properly centered on the truck, no further adjustment to gauge is required. Weld any shims and spacers to the inside of the frame brackets.

Finish installing the rear Railgear, other applicable options, hydraulic system, pneumatic connections, etc.

Continue on to Section 4.10 for Overall Alignment Procedure.

### **4.10 OVERALL ALIGNMENT PROCEDURE**

#### **4.10.1 Overall Alignment Procedure and Final Weight Adjustment**

See next page for alignment and weight drawing. Once you have completed the alignment procedure, return to Section 4.11 for continued installation instructions.

With the front and rear Railgear both installed and each squared individually to the truck frame, you must perform a final overall alignment of front to rear Railgear, and also adjust the weight setting.



### ALIGNMENT PROCEDURE

A) STEPS 1) and 2) must be completed in listed order and are assumed to be within specifications and should only be addressed, if after alignment of the railgear, excessive flanging occurs.

- 1) Frame should be square, to within 1/8" maximum, on the diagonal.
- 2) Rear drive axle should be square to frame within 1-1/6" maximum on the diagonal to achieve 0° thrust angle. this should be checked by a qualified alignment shop.

B) The following procedure applies to shop or field inspection.

- 1) Check air pressure in all tires. tires should be inflated to the minimum rating of the wheel or tire.
- 2) Place vehicle on straight and level track, or 3" channel to simulate rail. Lower the railgear to the rail so that front to rear and diagonal measurements can be made. (Note: these measurements can be made from any convenient locations, as long as it stays consistent from side to side.
- 3) If diagonal measurement is out of tolerance, adjustment of the front railgear must be made. The procedure for this is as follows (for D-1 & D-2 only): Place shim material between the stop block on the pivot arm (see dwg below) & where it comes into contact with the long arm. The location for the shim is most accessible from behind the front Railgear axle (example: shim on left side, it will push left axle forward). Once proper shimming has been obtained, weld the shim into place on the pivot arm. Max. allowable 1/4" - Contact DMF if outside the maximum range.

### RAIL WHEEL LOAD ADJUSTMENT PROCEDURE

Tire traction varies w/ every truck based on several factors such as weight & tire design. It can also vary on the same truck as equipment is added or deleted. Thus, we recommend performing the traction adjustments after all equipment is installed or removed. Since every truck differs, there is no exact procedure. However, we have found the following two methods to be a good guide. The true test is how the vehicle performs on rail.

#### METHOD #1

Note: Method #1 is a visual procedure of the tire capping on rail.

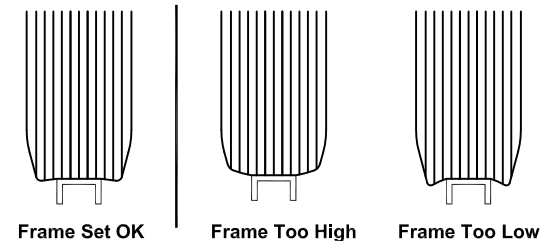
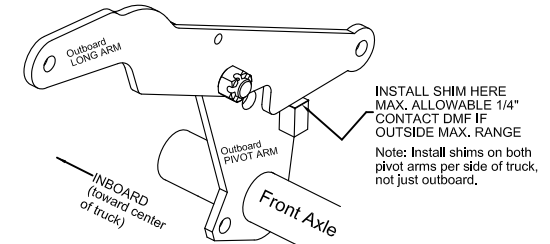
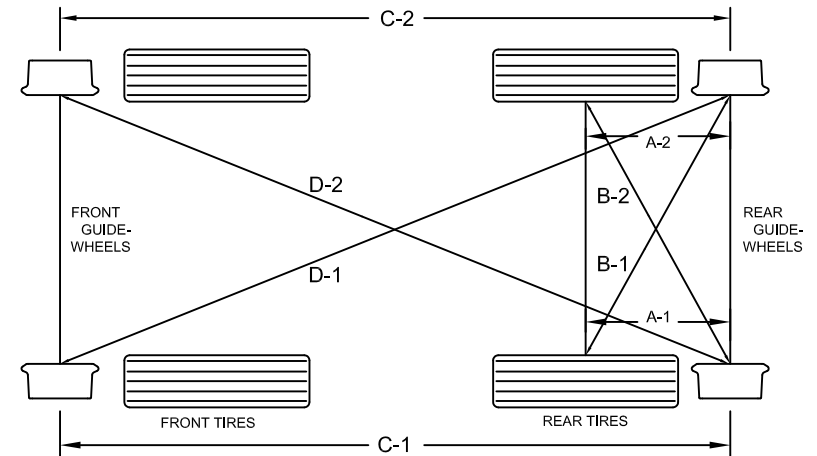
- 1) Grind off the welds on the (2) four hole mounting plates at the rear mounting bracket.
- 2) Loosen the (8) rear bracket mounting bolts.
- 3) Lower the railgear supporting the railgear with a floor jack or with the unit itself.
- 4) Remove or add spacer shim material located between the bottom of the truck frame and the shelf on the rear mounting bracket. Add shim to decrease traction and remove shim to increase traction (ref. side dwg. for illustration of proper tire capping).
- 5) Raise Railgear once again to contact the bottom of the truck frame.
- 6) Re-tighten the rear mounting bracket bolts to 154 ft/lb. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If multiple spacers are used, remember to weld spacers to one another.

#### METHOD #2

Note: Method #2 distributes the vehicles rear axle(s) weight(s) equally over all rear axles, including the Railgear.

- 1) If truck scales are available, weigh the vehicle's rear axle (if tandem, weigh both)
- 2) With front and rear Railgear in the rail position, add or remove shims until rear Railgear axle weight is distributed equally between rear truck axle & Railgear. If truck has tandem axle, the weight should be equally distributed over all 3 axles (tandem & railgear axle - 1/3, 1/3, 1/3).
- 3) Once weight is equally distributed, then raise Railgear to the highway position.
- 4) Re-tighten the rear mounting bracket bolts to 154 ft/lb. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If have multiple spacers, remember to weld spacers to one another.

INSPECTOR:			DATE:
SPECIFICATION	S/B = to	SPECIFICATION	TOLERANCES
A-1 _____	=	A-2 _____	± 1/8"
B-1 _____	=	B-2 _____	± 1/4"
C-1 _____	=	C-2 _____	± 1/8"
D-1 _____	=	D-2 _____	± 1/4"



	4/17/12	UPDATED AS PER 1630 MANUAL CHANGES	JDI	
	9/14/09	UPDATED AS PER 1630 MANUAL CHANGES	JBG	
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ±.063 .XX ±.030 .XXX OR .XXXX ±.005 DRILL SIZES: +.015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: RA AND 2B <small>BIGDIP, SHARP EDGES (1/8" DIA 2.40" MAX.)</small>				
TITLE: ALIGNMENT PROCEDURE & TEAR SHEET & TRACTION ADJUSTMENT PROCEDURES DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512				
DRAWN BY:	APPD BY:	DATE:		DRAWING NUMBER: REV:
TSH		12/20/91		M1630115 B

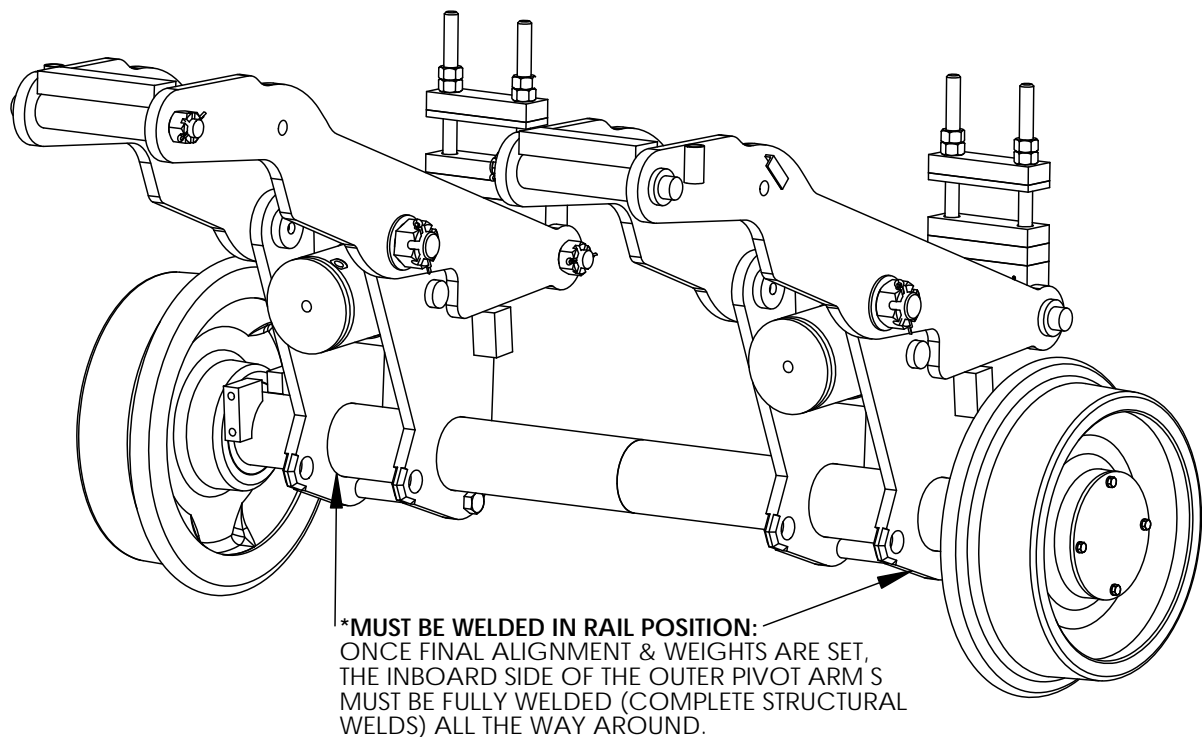
## 4.11 RAIL TEST

- Run vehicle forwards and backwards on rail.
- If available, run the vehicle through curves and switches.
- Verify alignment by observing the wear pattern on the wheel and the behavior of the vehicle. If adjustment is required refer to 4.10 Alignment.

## 4.12 FINAL WELD-OUT

Front Railgear:

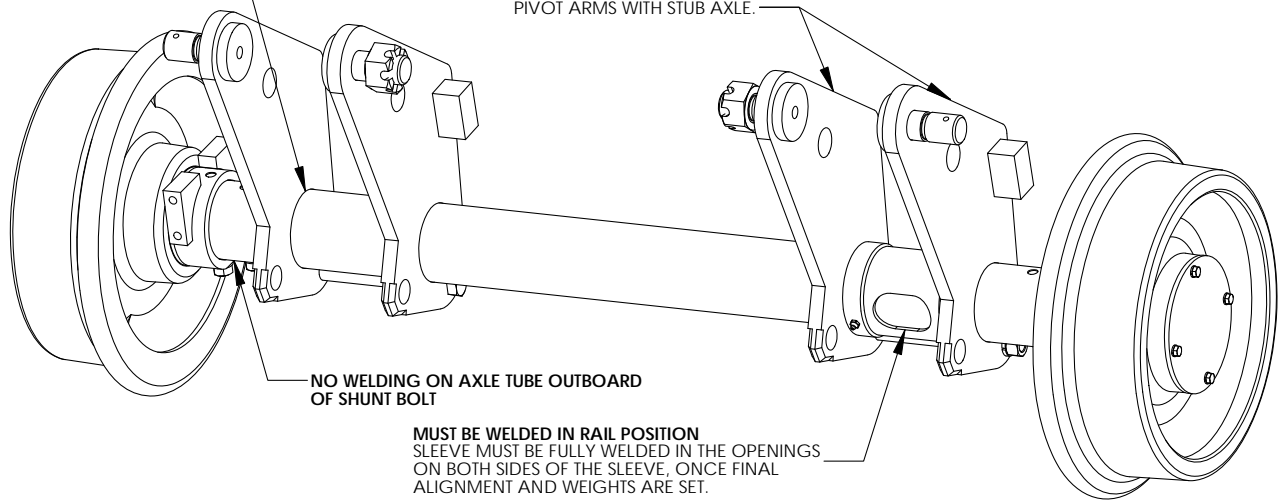
- Weld inboard side of outside pivot arm to axle tube all the way around as shown in figure 4.12.A. When welding stub axles, weld the driver side sleeve in the openings to the axle and the inboard side of the passenger side outer arm, see figure 4.12.B, do not weld on the axle tube outboard of the shunt bolt. The inside Pivot Arms should not be welded to the Axle Tube to facilitate ease of disassembly for repair or future maintenance.



**Figure 4.12.A** Standard Railgear Final Weld-out

**MUST BE WELDED IN RAIL POSITION**  
THE INBOARD SIDE OF THE OUTER PIVOT ARM  
MUST BE FULLY WELDED (COMPLETE STRUCTURAL  
WELDS) ALL THE WAY AROUND, ONCE FINAL  
ALIGNMENT AND WEIGHTS ARE SET.

**DO NOT WELD DRIVER SIDE**  
PIVOT ARMS WITH STUB AXLE.

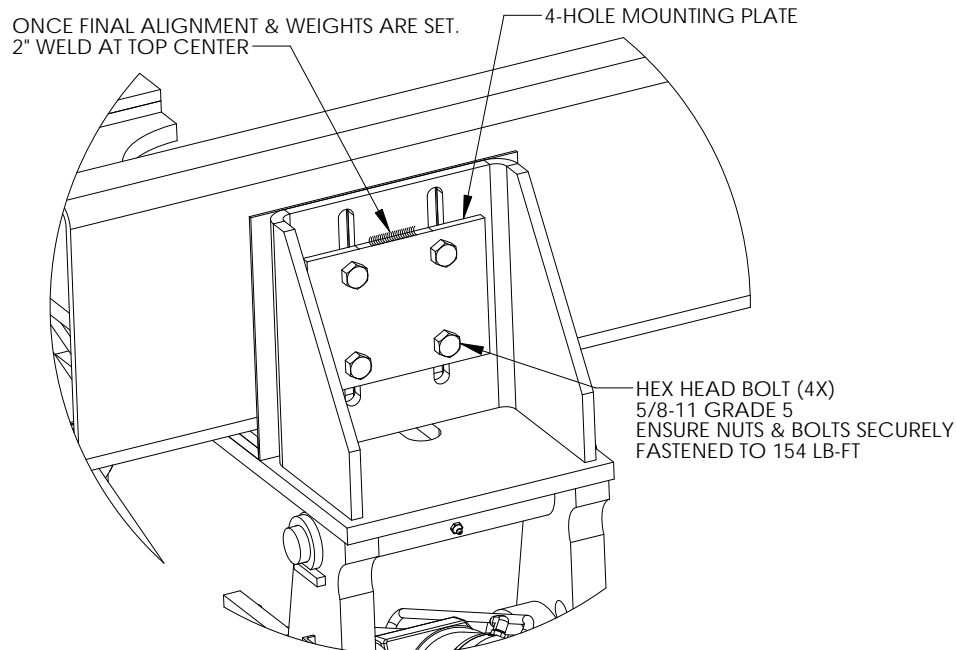


**Figure 4.12.B** Stub Axle Final Weld-out

- Fully weld, on all sides, front mounting blocks / cross tubes to truck frame.
- If shims were required, fully weld shims into place on all sides for each shim location.

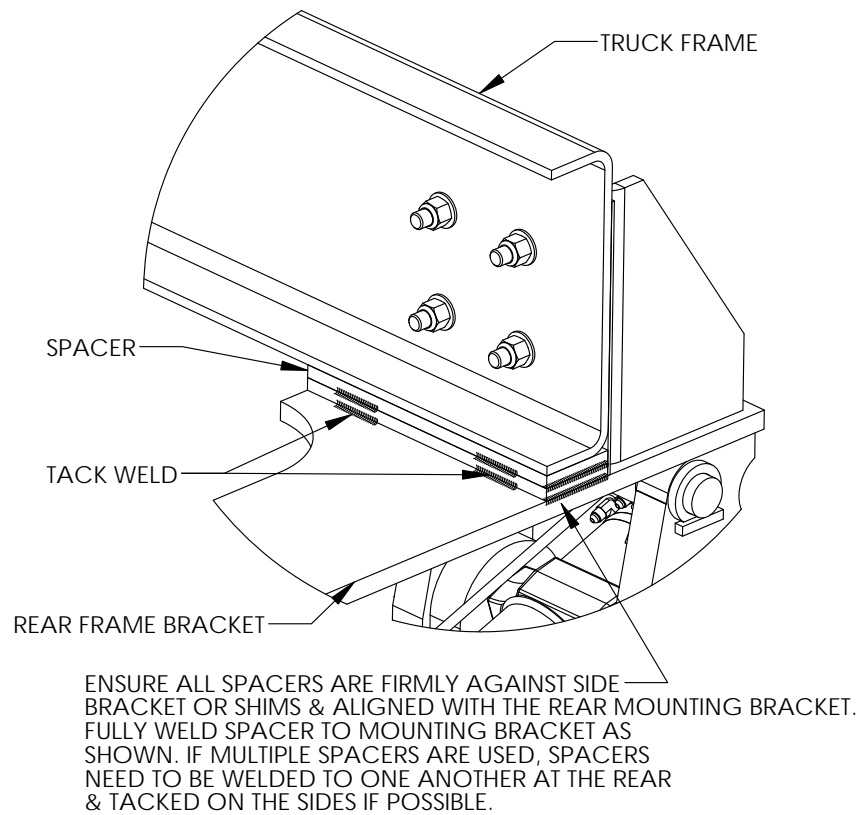
Rear Railgear:

- Weld 4-hole mounting plate to rear frame bracket as shown in figure 4.12.C.



**Figure 4.12.C** Mounting Plate Weld-Off

- Ensure all spacers are firmly against side bracket and aligned with the rear mounting bracket, then fully weld spacer to mounting bracket as shown in figure 4.12.D.
- If multiple spacers are used, spacers must be fully welded to one another on the rear, and tack welded on the sides, as shown in figure 4.12.D.



**Figure 4.12.D** Welding of Spacer

#### 4.13 INSTALL DECALS

- Label the vehicle according to the diagram on the back of the decal sheet. See next page.

ITEM	PART NO.	QTY	DESCRIPTION
1	800190	1ea.	P/N's 800113, 800114, 800116, 800118, 800119 & 800122
2		2ea.	P/N's 800117 & 800135

### INSPECTION AND MAINTENANCE OF D.M.F. GUIDE WHEEL SYSTEM

#### DAILY:

Visually inspect rail gear for hydraulic leaks, loose fasteners, and excessive wear.  
Spin all four wheels noting any bearing noise or resistance.  
Check level of hydraulic oil.  
Compare left and right wheels for wear (particularly diagonal flanges).

#### WEEKLY:

Grease all fittings on rail.

Six (6) on front assembly.

Fourteen (14) on rear assembly.

Inspect the bearing grease every 2,000 miles or 6 months (whichever comes first).  
Inspect bearings and grease cavity by removing hubcaps. Unless bearing problem is suspected, the bearings do not need to be removed or repacked. If repacking is required, the grease cavity should be only 80% filled with suitable grease. Replace hubcaps using a bead of Form-A-Gasket (or equal).

#### ANNUALLY:

Change hydraulic oil filter element.

**DIVERSIFIED METAL FABRICATORS, INC.** (404) 875-1512 ATLANTA, GA

800114



**SECURE RAILDOGS BEFORE  
OPERATING DUMP**  
**RELEASE BEFORE TRAVEL**

800122

### SAFETY INSTRUCTIONS

Lock front wheels  
straight ahead for  
on-rail travel.

800119



RELIEF VALVE SETTINGS: 2000 PSI, FRONT  
1500 PSI, REAR  
DO NOT EXCEED: 2500 PSI, FRONT VALVE  
DO NOT EXCEED: 2000 PSI, REAR VALVE  
DO NOT BOTTOM-OUT RELIEFS, IF ADJUSTED

800135

### OPERATION OF D.M.F. GUIDE WHEEL SYSTEM

#### TO PLACE VEHICLE ON RAIL

1. Drive vehicle on crossing, centering it over tracks.
2. Once centered over tracks, remove front and rear safety pins.
3. Lower rear wheels first.
  - A. If rear is not completely centered (within 4"), rear rail wheels will center truck on rail.
  - B. With rear wheels fully extended and properly seated on rail, install safety pin into lower hole on both sides.
4. Center front rail wheels over rail.
  - A. If front is not completely centered over rail, maneuver truck so that it is.
  - B. Front vehicle wheels must be straight ahead.
5. Double check all flanges to assure they are seated properly on rail and safety pins are installed.
6. Engage steering wheel lock if equipped.

Safe operating speeds on rail will be governed by track conditions and existing railroad rules and regulations. Under no conditions should vehicle be operated over 30 MPH on track.

**DIVERSIFIED METAL FABRICATORS** (404) 875-1512 ATLANTA, GA

800116

#### TO REMOVE VEHICLE FROM RAIL

1. Drive vehicle over road crossing.
2. Either front or rear wheels may be activated first.
3. Front rail wheels
  - A. Retract front rail wheels completely.
  - B. Once retracted, install safety pins.
4. Rear rail wheels
  - A. Remove safety pins.
  - B. Fully retract rear rail wheels.
  - C. Re-install rear safety pins.
5. Double check all safety pins are in proper location.
6. Disengage steering wheel lock if equipped.

#### INSTRUCTIONS-

1. REMOVE SAFETY PINS
2. ACTIVATE VALVE
  - A. PUSH- RAIL POSITION
  - B. PULL- HIGHWAY POSITION
3. REPLACE SAFETY PINS IN PROPER LOCATION.

800117



HI-RAIL VEHICLE COMPLETED BY: \_\_\_\_\_

WITH APPLICATION OF HI-RAIL AND FINISHED BODY, THIS VEHICLE HAS \_\_\_\_\_ POUNDS OF AVAILABLE PAYLOAD.

DATE OF COMPLETION OF HI-RAIL EQUIPPED VEHICLE: mo \_\_\_\_\_ yr \_\_\_\_\_

**CAUTION:** THIS MULTIPURPOSE VEHICLE HAS SPECIAL DESIGN AND EQUIPMENT FEATURES FOR OFF-ROAD USE. IT HANDLES DIFFERENTLY FROM AN ORDINARY PASSENGER CAR IN DRIVING CONDITIONS WHICH MAY OCCUR ON STREETS, HIGHWAYS, AND OFF-ROAD.

WEIGHT AND LOCATIONS OF AVAILABLE PAYLOAD MAY ALSO AFFECT THE HANDLING OF THIS VEHICLE. DRIVE WITH CARE AND WEAR SAFETY BELTS AT ALL TIMES.

FOR PRECAUTIONS, READ THE VEHICLE OWNER'S GUIDE AND HI-RAIL OPERATORS SERVICE AND PARTS MANUAL.

800118

REV		DATE	DESCRIPTION		BY	APP
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p><b>TOLERANCES:</b> (UNLESS SPECIFIED) <b>COMMON SENSE PREVAILS</b> FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX OR .000 ± .005 DRILL SIZES: + .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B <small>BREAK SHARP EDGES (1.0 DIA X .40" MAX)</small></p> </div> <div style="width: 30%;"> <p><b>TITLE:</b> INSTRUCTION &amp; SAFETY DECALS</p> <p>DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512</p> </div> <div style="width: 30%;"> <p>DRAWN BY: KLC</p> <p>APPD BY:</p> <p>DATE: 10/12/98</p> <p>DRAWING NUMBER: ST1652</p> <p>REV: #</p> </div> </div>						

## 4.14 VELCRO STEERING WHEEL LOCK

### Installation Instructions for

#### The DMF Velcro® Steering Wheel Lock

Overview: The DMF Velcro® steering wheel lock consists of two 2" wide adhesive backed "hook" strips and a 4" wide piece of "loop" fabric. A piece of adhesive backed hook is placed on the steering wheel column and a second piece placed on the top flat of the steering wheel hub. The 4" wide piece of loop fabric can then be applied to bridge the gap between column and wheel preventing the front tires from accidentally being turned while on the rail. However, in the event of an emergency, the steering wheel can be forcibly turned and the Velcro fasteners will separate allowing the driver to steer the vehicle.

- 1) Clean the areas where the self adhesive 2" wide "hook" strips will be applied on the steering column and wheel with rubbing alcohol and a clean cloth.
- 2) Allow the column and wheel to dry.
- 3) Remove the adhesive backing from the "hook" strips and apply them to the top of the steering wheel hub and the column as close to the wheel-column gap as possible.

NOTE: Trim the strips to fit around obstructions such as hazard light switches.



- 4) Allow the adhesive to cure for 24 hours prior to attaching the 4" loop fabric.
- 5) When putting the truck on the rail, position the 4" loop fabric to bridge the gap between the hooks on both the column and wheel as shown below and press firmly.



- 6) To remove the lock simply pull on the 'D' ring and store the piece of Velcro fabric.

## 4.15 INSTALLATION REVIEW CHECKLIST

The following checklist is intended to assist the installer in re-checking and verifying aspects of the installation that are often overlooked or forgotten.

- ☐ Check tire pressures.
- ☐ Rail test the truck to check for good traction and braking. A good industrial siding or some authorized track time will be required. Check that Rail wheels with brakes do not lock-up or slide.
- ☐ Adjust the Railgear height as required.
- ☐ Re-check alignment of the Rear Railgear to the rear axle.
- ☐ Weld the Mounting Plate to the Rear Frame Bracket with two 2" welds (at the top center and bottom center). Welding the plates must be done; DO NOT forget to do it.
- ☐ Double check all welds and fasteners, and mounting cotter pins. Tie strap all hydraulic hoses, air hoses, and electrical wires away from exhausts and moving parts. Ensure that all hydraulic and air hoses have sufficient radius at bends.
- ☐ Top off the hydraulic oil in the tank.
- ☐ Verify grease installed at all grease fittings (see section 3.2)
- ☐ Touch-up the black acrylic enamel paint on the Front and Rear Railgear.
- ☐ Raise the Railgear (highway position) and install all of the pin-offs.
- ☐ Apply the Decal Kit.
- ☐ Check Front Alignment:
  - o Front Mounting Pin height: 25-1/2"
  - o Rear Mounting Pin height: 12-3/4"
- ☐ Check Rear Alignment
  - o Tire to Rail Wheel center:                      Single Axle: 15-1/4"                      Tandem Axle: 11-1/4"
  - o Minimum Truck Frame extension: Single Axle: 21-1/4"                      Tandem Axle: 17-1/5"
- ☐ Check overall measurements:
  - o Rear Truck Axle to Rear Railgear Axle (straight):                      A1 = A2 (within 1/8")
  - o Rear Truck Axle to Rear Railgear Axle (diagonal):                      B1 = B2 (within 1/4")
  - o Front Railgear to Rear Railgear (straight):                      C1 = C2 (within 1/8")
  - o Front Railgear to Rear Railgear (diagonal):                      D1 = D2 (within 1/4")
- ☐ Raise and lower Railgear and verify pin-off at highway and rail positions
- ☐ Verify that all bodywork is replaced and secure.
- ☐ In a parking lot or open area, verify that the truck tires and rims do not contact the Railgear in any bump, droop, or steering position.
- ☐ Check for any rattles and vibration.

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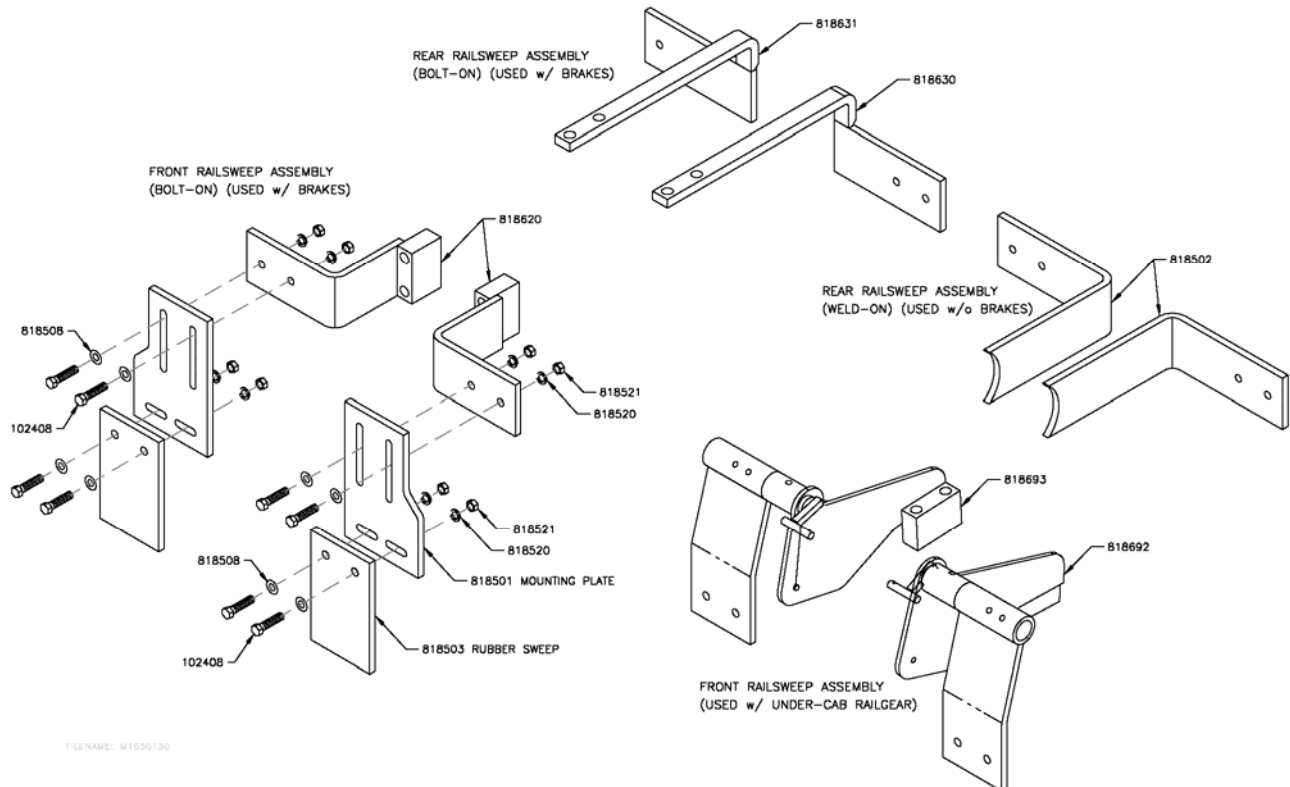
## SECTION 5.0 RAILGEAR OPTIONS

<b>5.1</b>	<b>RAIL SWEEPS .....</b>	<b>5-2</b>
<b>5.2</b>	<b>PIN-OFF OPTIONS .....</b>	<b>5-3</b>
<b>5.3</b>	<b>BRAKES .....</b>	<b>5-7</b>
5.3.1	Cobra Air Brake Location.....	5-7
5.3.2	Front Air Brake Installation.....	5-8
5.3.3	Rear Air Brake Installation (RW-1630) .....	5-8
5.3.4	Air Brake Plumbing Installation .....	5-9
5.3.5	Cobra Air Brake System Plumbing Overview .....	5-9
5.3.6	Inspection and Adjustment.....	5-12
5.3.7	Testing.....	5-12
5.3.8	Brake Parts .....	5-12
<b>5.4</b>	<b>TWO-PIECE WHEELS .....</b>	<b>5-14</b>

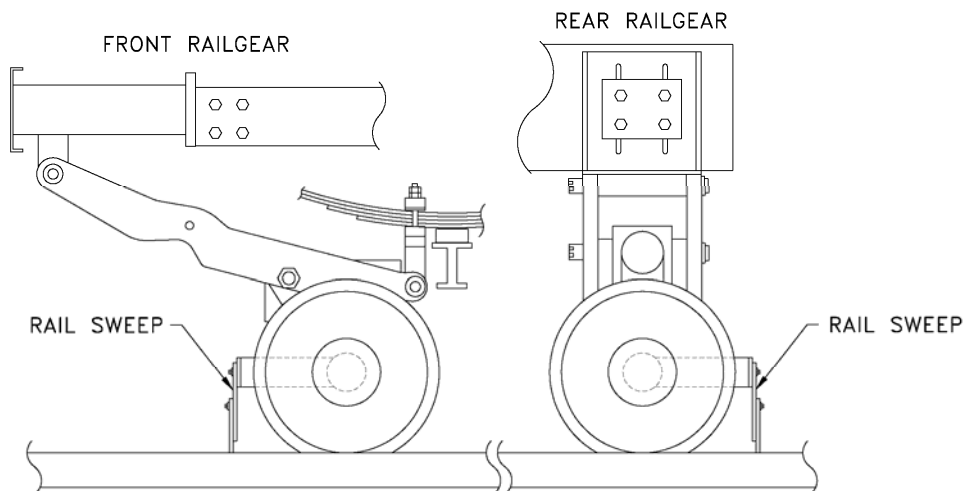
## 5.1 RAIL SWEEPS

The components that make up the standard Front and Rear Rail Sweeps for Railgear without any brakes are different than Rail Sweeps for Railgear with Cobra Air Brakes. For Rail Sweeps provided with Cobra Air Brakes, the mounting brackets are shorter.

Installation of Rail Sweeps is done while the Railgear is in the rail position. For standard Rail Sweeps (without brakes), weld the Mounting Bracket directly to the Railgear axle tube oriented so that the Rubber is flush with the rail. For Rail Sweeps with Cobra Air Brakes, bolt the shorter Mounting Bracket directly to the Air Brake structure. On the front, bolt on the side facing forward; on the rear, bolt to the top of the Air Brake (which faces backward).



**Figure 5.1.A** Rail Sweeps

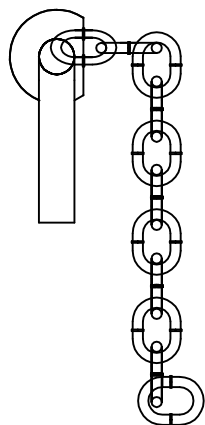


**Figure 5.1.B**  
Rail Sweep Position

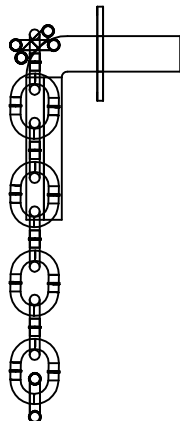
## **5.2 PIN-OFF OPTIONS**

See drawings on next three pages.

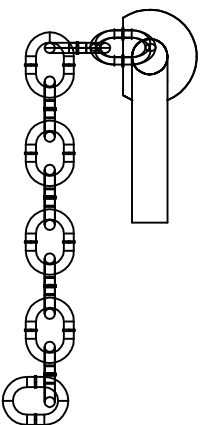
**NOTE: IF YOU ORDER MANUAL PIN-OFFS WITH YOUR RAILGEAR, THEY SHOULD ALREADY BE WELDED IN THEIR PROPER LOCATION.**



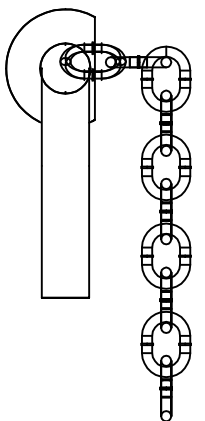
P/N 818163  
DRIVER'S SIDE  
FRONT



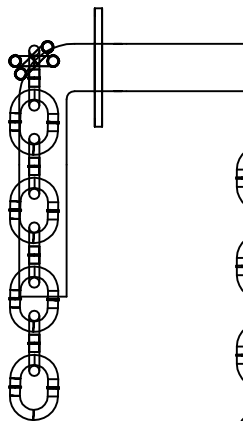
SIDE VIEW



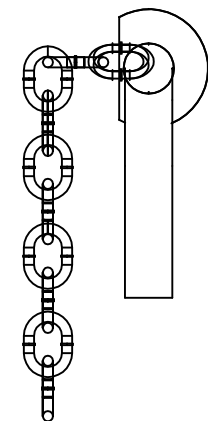
P/N 818164  
PASSENGERS SIDE  
FRONT



P/N 818234  
PASSENGER SIDE  
REAR



SIDE VIEW

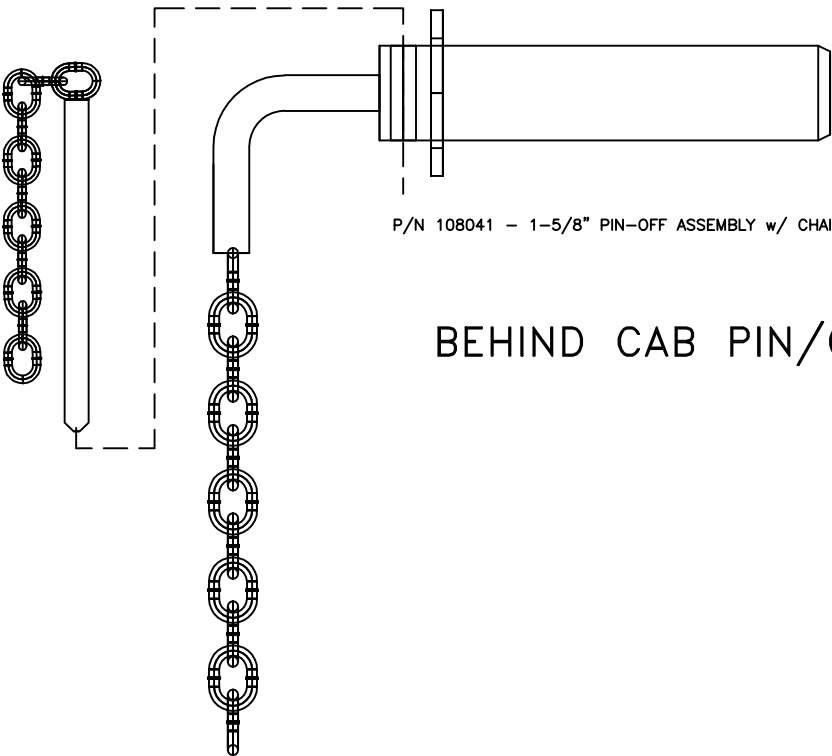


P/N 818245  
DRIVER SIDE  
REAR

## 1630/50 MANUAL PIN/OFFS

ITEM	PART NO.	QTY	DESCRIPTION
1			
2			


P/N 108045 - AUXILIARY PIN-OFF ASSEMBLY  
P/N 108044 - AUXILIARY PIN-OFF CHAIN



P/N 108041 - 1-5/8" PIN-OFF ASSEMBLY w/ CHAIN (BEHIND-CAB)

## BEHIND CAB PIN/OFF

**\*Must have serial # when ordering parts\***

5/26/11	FIXED TYPO (AUXILIARY)	NEH	
8/11/10	CHANGED P/N 108042 TO 108041	JBG	
REV	DATE	DESCRIPTION	BY APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH. ± 1/32 FRAC. OTHER ± 1/16 .X ± .063 .XX ± .030 .XXX OR .000 ± .005 DRILL SIZES ± .005 ANGULAR ± 1° SURF. FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES			
DRAWN BY: JBG		APPD BY:	TITLE: RW-1630 ASSORTED PIN-OFF ASSEMBLIES DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512
1/25/10		DRAWING NUMBER: M1630100	REV: B

SPECIFY THE CABLE THAT  
BEST FITS YOUR APPLICATION.

REPLACEMENT CABLES	
P/N	LENGTH
818577	41"
818576	50"
818575	64"
818578	78"
818579	97"
818580	120"

There are two different types of remote pin-offs available for both front and rear Railgear, and they can be used in any combination. The two different types are:

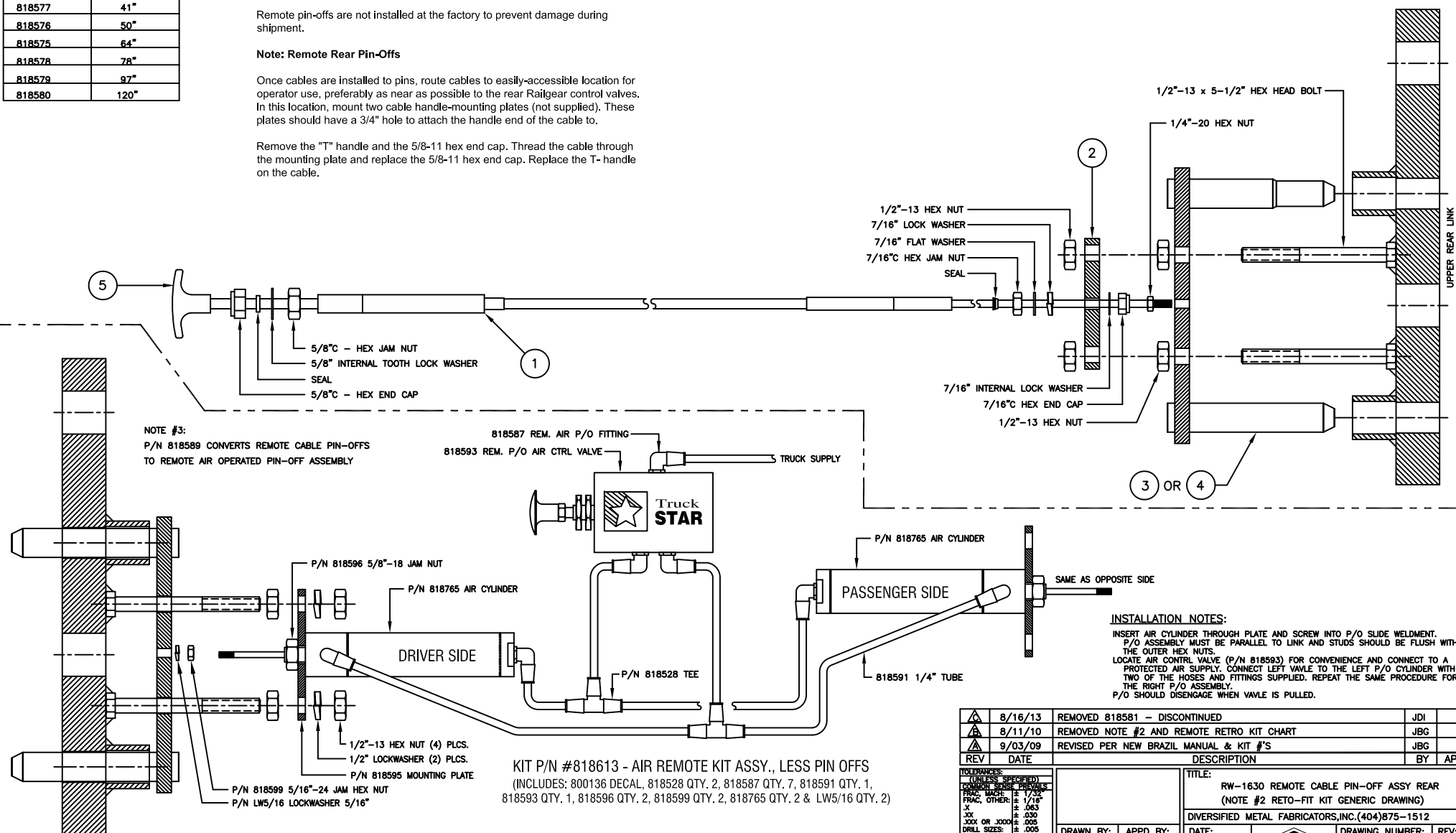
- Cable operated
- Cable operated with air

**Note: Remote Rear Pin-Offs**

Once cables are installed to pins, route cables to easily-accessible location for operator use, preferably as near as possible to the rear Railgear control valves. In this location, mount two cable handle-mounting plates (not supplied). These plates should have a 3/4" hole to attach the handle end of the cable to.

Remove the "T" handle and the 5/8-11 hex end cap. Thread the cable through the mounting plate and replace the 5/8-11 hex end cap. Replace the T- handle on the cable.

ITEM	PART NO.	QTY	DESCRIPTION
1	NOTE 1	(REF.)	REMOTE PIN-OFF CABLE (MORSE)
2	818563	(REF.)	REMOTE PIN-OFF MOUNTING PLATE
3	818550	(REF.)	REMOTE PIN-OFF ASSY.(for w/LONG LINKS)(7-3/4" to C)
4	818551	(REF.)	REMOTE PIN-OFF ASSY.(for w/SHORT LINKS)(5-3/4" to C)
5	818571	(REF.)	REMOTE PIN-OFF "T-HANDLE" (MORSE)



SPECIFY THE CABLE THAT  
BEST FITS YOUR APPLICATION.

REPLACEMENT CABLES	
P/N	LENGTH
818577	41"
818576	50"
818575	64"
818578	78"
818579	97"
818580	120"

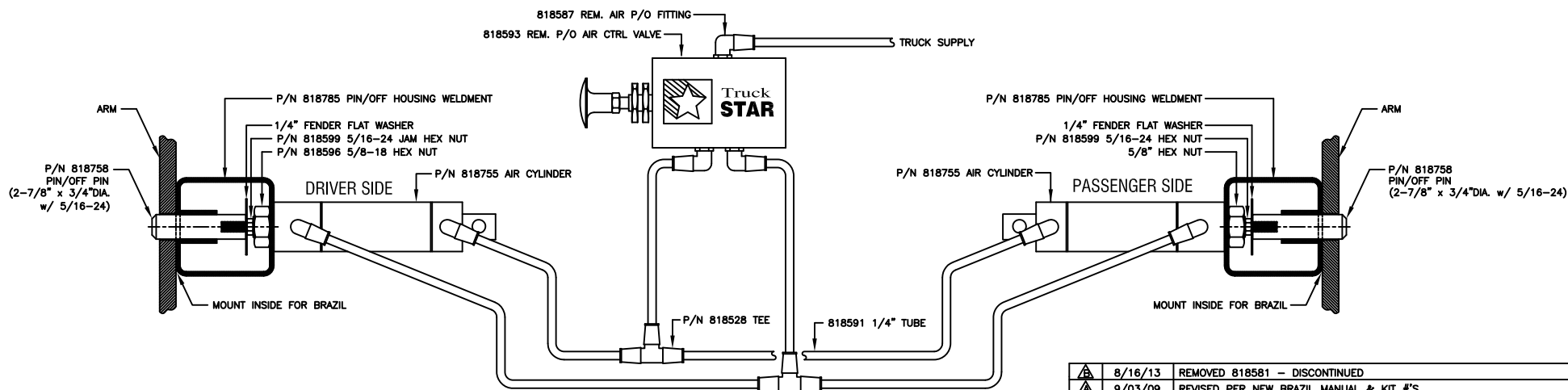
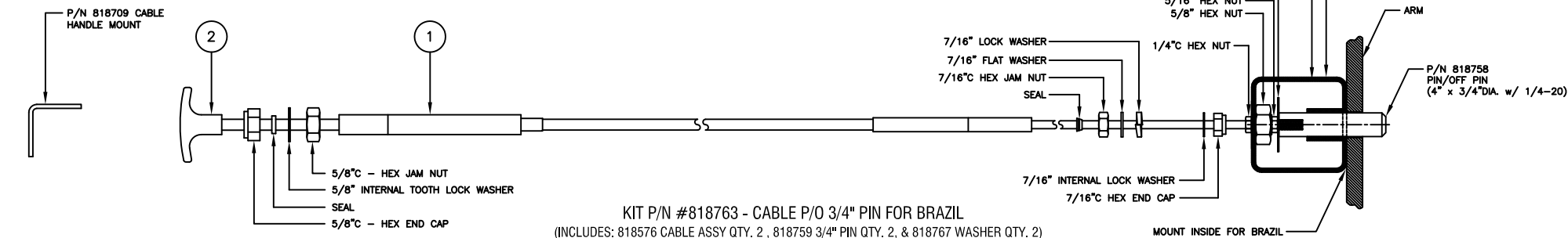
There are two different types of remote pin-offs available for both front and rear Railgear, and they can be used in any combination. The two different types are:

- Cable operated
- Air operated

**Note: Remote Front Pin-Offs (Shown w/ & w/o Air Cylinder)**




Once cables are installed to pins, route cables to easily-accessible location for operator use, preferably as near as possible to the front Railgear control valve. In this location, mount two cable handle-mounting plates (not supplied). These plates should have a 3/4" hole to attach the handle end of the cable to.

Remove the "T" handle and the 5/8-11 hex end cap. Thread the cable through the mounting plate and replace the 5/8-11 hex end cap. Replace the T- handle on the cable.



KIT P/N #818774 - FRONT REMOTE AIR KIT ASSY., LESS PIN OFFS  
(INCLUDES: 800136 DECAL, 818528 QTY. 2, 818587 QTY. 7, 818591 QTY. 1, 818593 QTY. 1,  
818596 QTY. 2, 818599 QTY. 2, 818755 QTY. 2, 818758 QTY. 2, & FW1/4 QTY. 2)

ITEM	PART NO.	QTY	DESCRIPTION
1	NOTE 1	(REF.)	REMOTE PIN-OFF CABLE (MORSE)
2	818571	(REF.)	REMOTE PIN-OFF "T-HAND" (MORSE)

	8/16/13	REMOVED 818581 - DISCONTINUED	JDI	
	9/03/09	REVISED PER NEW BRAZIL MANUAL & KIT #S	JBG	
	REV	DATE	DESCRIPTION	BY
TOLERANCES: (UNLESS OTHERWISE SPECIFIED) DIMENSIONS ± .0005 HOLE DIA. ± .0005 FRAC. MACH. ± .1732 FRAC. OTHER ± 1/16" .063 .35 .500 OR .5000 ± .005 DRILL SIZES: ± .005 SURF. FINISH: 125 MICRO THREADS: 125 MICRO BREAK AWAY EDGES		TITLE: RW-1630 REMOTE CABLE PIN-OFF ASSY FRONT (NOTE #2 RETO-FIT KIT GENERIC DRAWING) DIVERSIFIED METAL FABRICATORS, INC.(404)875-1512		
DRAWN BY: KLC APPD BY:		DATE: 10/06/98	DRAWING NUMBER:  M1630112	REV: B

## 5.3 BRAKES

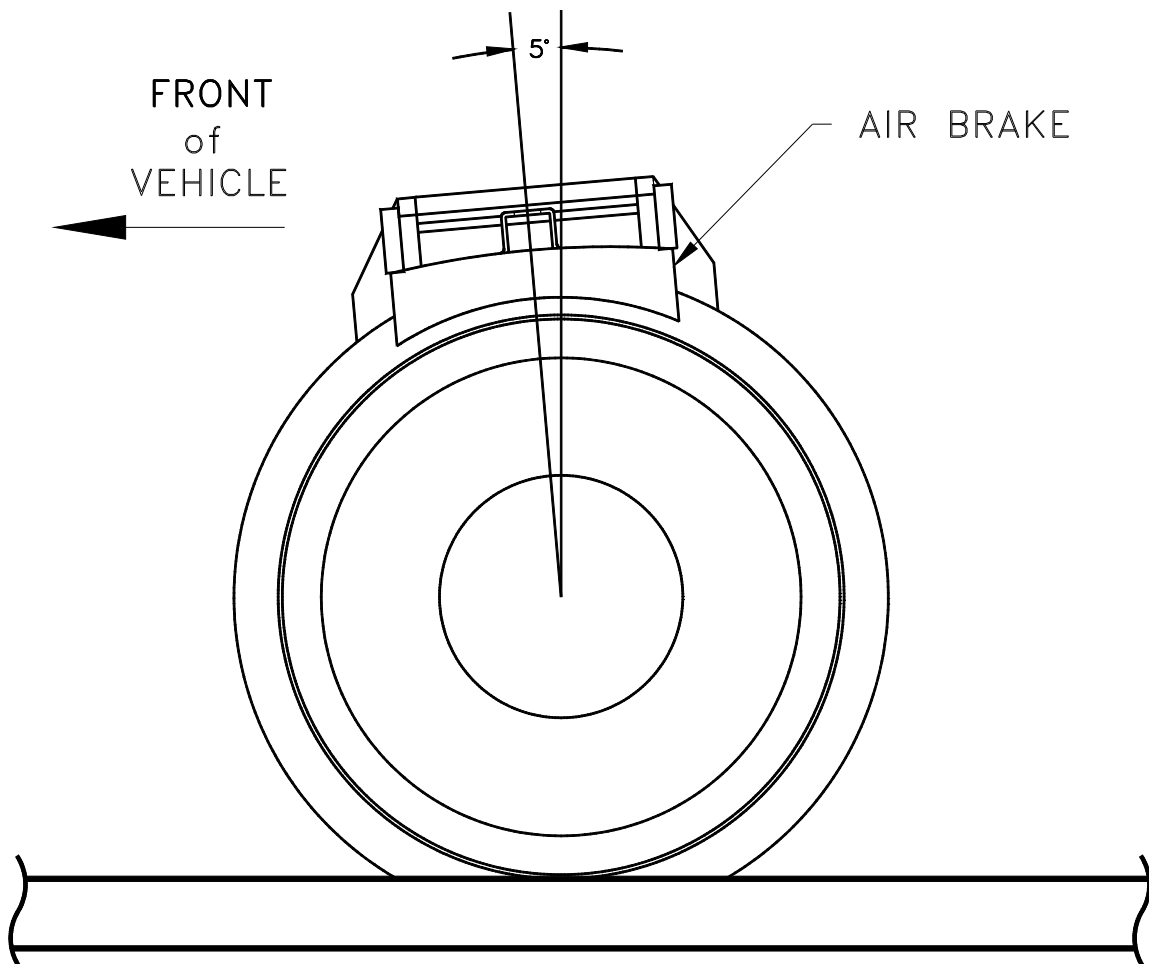
**NOTE:**

The rail wheel brake system is intended to assist the existing vehicle brakes when in the rail mode. As the vehicle rear tires are in contact with the railhead, the primary braking effort is derived from the rubber tires. Rail wheel brakes alone are insufficient to stop the vehicle in a reasonable distance.

DMF's RW-1630 Railgear uses an optional air braking system. The same Cobra air braking system is used for both the front and rear Railgear. For a detailed drawing of the Cobra Air Brake Assembly, section 5.3.8.

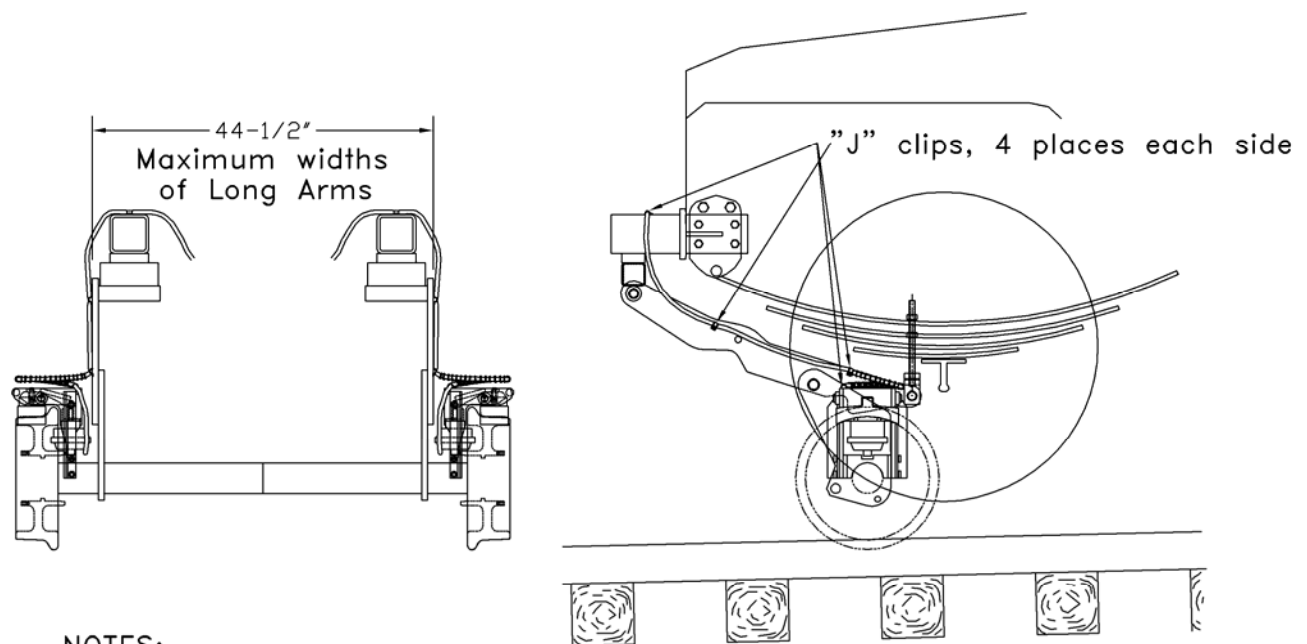
While the Front and Rear Railgear is in the rail position, the front Cobra Air Brake assembly should be located as shown below. The rear Cobra Brake assembly is oriented at the factory and will not need to be changed.

### 5.3.1 Cobra Air Brake Location



**Figure 5.3.1** Cobra Air Brake Location

### 5.3.2 Front Air Brake Installation

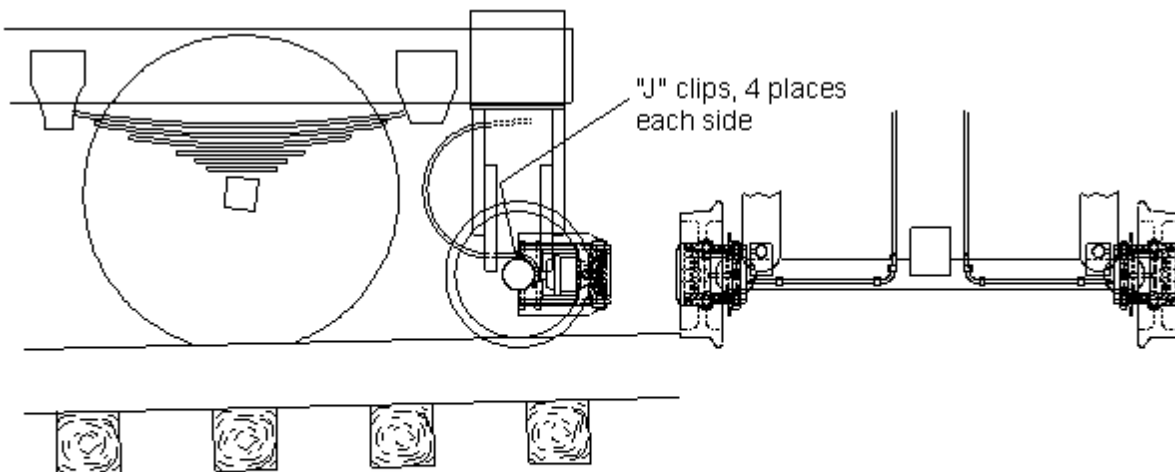


#### NOTES:

- \* Run the supplied hoses through the "J" clips with the spring guards located in the loops left at the Brake Assemblies. The 75" Hose is for the passenger side & the 62" Hose is for the driver side.
- \* Mount Air Brake Valve Assembly to an appropriate place near the Front Railgear (usually on the Front Valve Assembly Plate) with supplied Relay
- \* Brake Hoses attach to the Front Valve Assembly.

**Figure 5.3.2** Front Air Brake Installation

### 5.3.3 Rear Air Brake Installation (RW-1630)



- \* Run the supplied hoses through the "J" clips. Rear Hoses are 59" long.
- \* Mount Air Brake Valve Assembly to an appropriate place near the Rear Railgear (usually on the Rear Frame Bracket) with supplied Relay Mount.
- \* Attach Brake Hoses to the Air Brake Valve Assembly.

**Figure 5.3.3** Rear Air Brake Installation



### 5.3.4 Air Brake Plumbing Installation

An air toggle valve, on a plate labeled brakes "on/off", is to be located on the vehicle instrument panel. This valve disconnects the guide wheel braking system from the vehicle airbrake system by interrupting the CONTROL line air pressure to the guide wheel system only.

On the Front Valve Plate Assembly and Rear Frame Bracket, an airbrake relay valve will be located. The CONTROL line to this relay valve comes from the toggle valve described above. The SUPPLY line to this relay comes from the Pressure Protection Valve, which is plumbed onto the air reservoir. There is a ball valve and an adjustable pressure regulator in the SUPPLY line before the relay valve. The ball valve will disconnect the guide wheel braking system from the vehicle airbrake system (regardless of the position of the toggle valve) by interrupting the SUPPLY line air pressure to the guide wheel system only. The adjustable pressure regulator allows the braking effort on each axle to be set so that the Rail wheels do not lock up and slide.

The guide wheel brake chambers are connected to the DELIVERY ports on the guide wheel air brakes relay valve.

Install air lines and valves per the drawing on next page. Make certain that the Front Air Brake Valve indicates that it has been preset to 75 psi and the Rear Air Brake Valve is labeled 30 psi. The brake valves are already preset at the factory (front at 75 psi, rear at 30 psi).

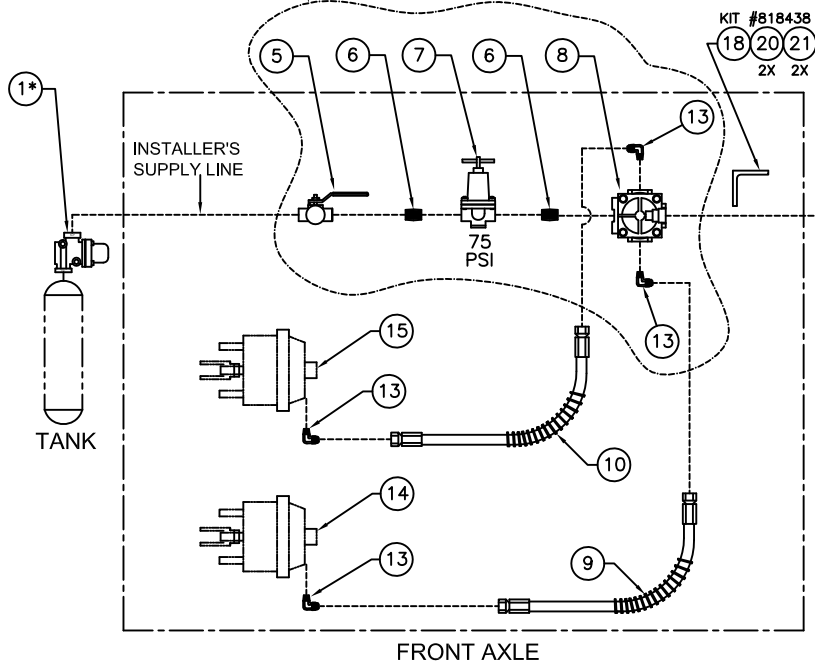
### 5.3.5 Cobra Air Brake System Plumbing Overview

**\*\* See additional detailed drawing on next page \*\***

ITEM	PART NO.	QTY	DESCRIPTION
1	818483	1*	VALVE, PRESSURE PROTECTION (BW103976)(SPL PR-4)
2	818484	1	MTG ANGLE BRKT, AIR BRAKE VALVE - OPTIONAL
3	818485	1	VALVE, TOGGLE AIR (VE032037)
4	818486	1	LEGEND PLATE (ON-OFF FOR TOGGLE AIR VALVE)
5	818488	2	VALVE, BRASS BALL (3/8" - PBV500P-6)
6	818498	4	FITTING, NIPPLE (215PN-6)
7	818489	2	REGULATOR, AIR (MIDLAND KN31070)
8	818490	2	VALVE, AIR RELAY (MIDLAND KN28500)
9	818492	1	HOSE, AIR LINE; FRONT LH w/SPRING GUARD (H06906 x 62")
10	818494	1	HOSE, AIR LINE; FRONT RH w/SPRING GUARD (H06906 x 75")
11	818496	2	HOSE, AIR LINE; REAR (H06906 x 59")
12	818497	2	FITTING, STRAIGHT (0104-6-6B SAE)
13	818499	6	FITTING, 90° (2104-6-6B)
14	818458	1	AIR BRAKE CHAMBER, FRONT DRIVER'S SIDE
15	818459	1	AIR BRAKE CHAMBER, FRONT PASSENGER'S SIDE

Note: Items #5, 6, 7, 8,  
& 13 shipped assembled.  
(Front Kit p/n 818413)

FROM VEHICLE AIR BRAKE  
CONTROL CIRCUIT



FRONT AXLE

\*Item #1 p/n 818483 - only qty. 1 included w/ front brakes

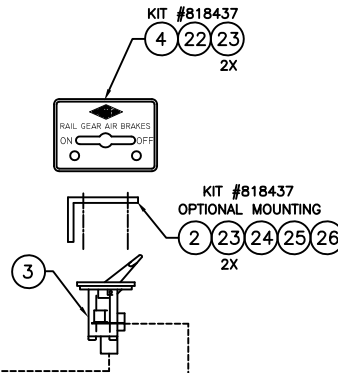
**KIT #818413 (FRONT) INCLUDE ITEMS: #5, #6, #7, #8, & #13**

**KIT #818415 (REAR) INCLUDE ITEMS: #5, #6, #7, #8, & #13**

**KIT #818437 INCLUDE ITEMS: #2, #3, #4, #22, #23, #24, #25, & #26**

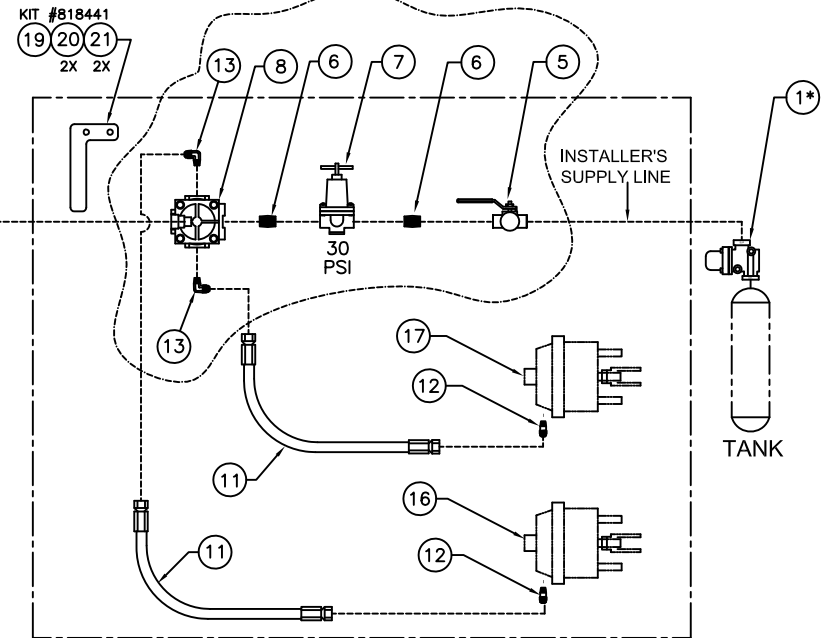
**KIT #818438 INCLUDE ITEMS: #18, #20 (2x), & #21 (2x)**

**KIT #818441 INCLUDE ITEMS: #19, #20 (2x), & #21 (2x)**



ITEM	PART NO.	QTY	DESCRIPTION
16	818460	1	AIR BRAKE CHAMBER, REAR DRIVER'S SIDE
17	818461	1	AIR BRAKE CHAMBER, REAR PASSENGER'S SIDE
18	818491	1	VALVE MOUNT BRKT, FRONT AIR BRAKE
19	818493	1	VALVE MOUNT BRKT, REAR AIR BRAKE
20	818421	4	HEX HEAD 5/16-18 X 1-1/4"
21	20342	4	5/16-18 NYLON LOCK NUT
22	818424	2	ROUND HEAD MACHINE SCREW #10-24 X 3/4"
23	818425	4	#10 LOCK WASHER (LW#10)
24	605101	2	#10 FLAT WASHER
25	605028	2	#10-24 HEX NUT
26	818887	2	RD HEAD MACHINE SCREW #10-24 X 1.00"

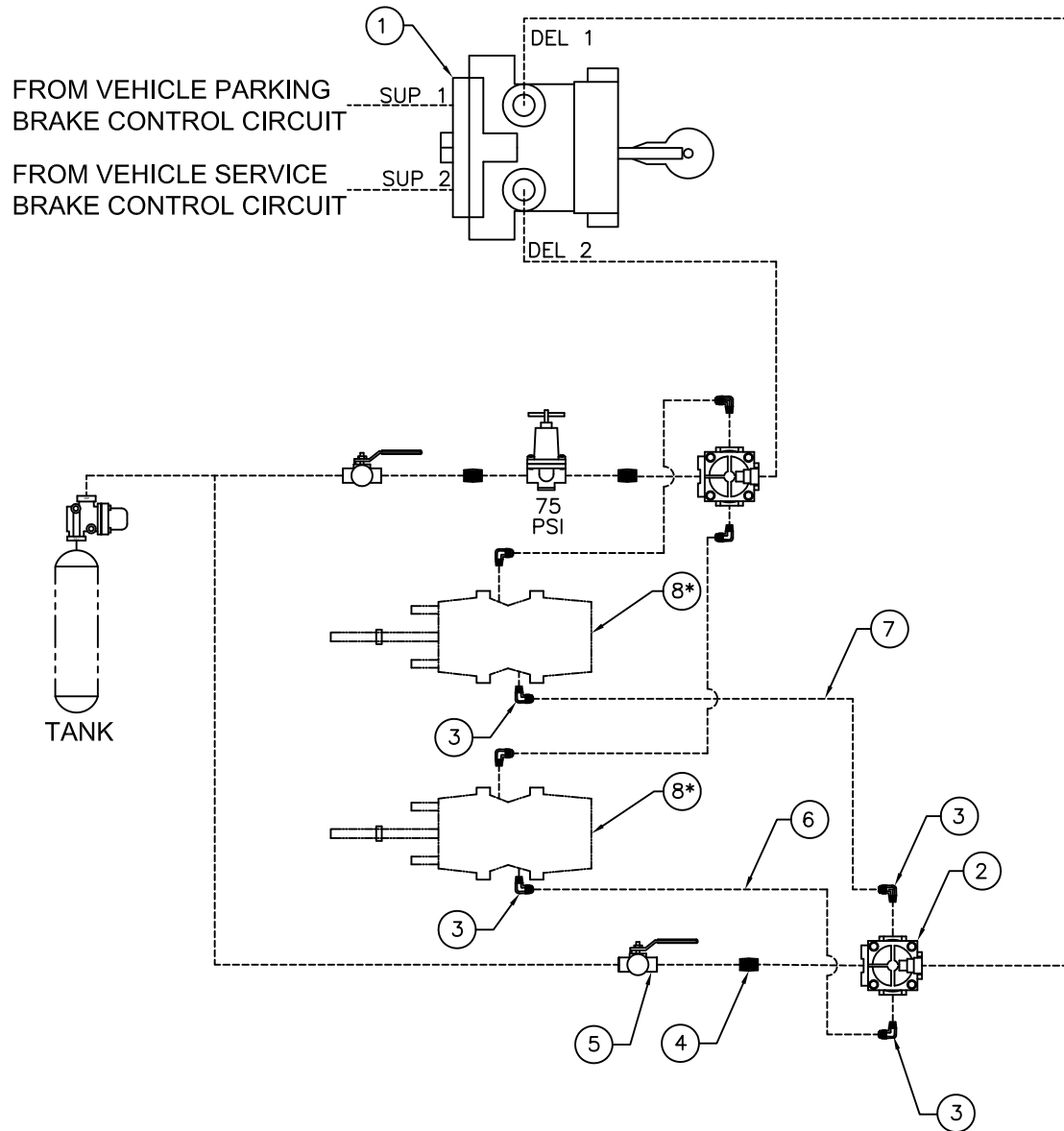
Note: Items #5, 6, 7, 8,  
& 13 shipped assembled.  
(Rear Kit p/n 818415)



INCLUDED WITH REAR AXLE KIT ONLY

7/17/13	CORRECTED HARDWARE PART #'S	BJF
8/19/09	REVISED ITEM #1 TO QTY. 1 AND ADDED NOTES	JBG
11/28/94	ADDED TANKS	MSM
REV	DATE	DESCRIPTION
TOLERANCES:		
UNLESS SPECIFIED		
CONFORM TO ASME Y14.5		
FRACTIONAL: ± 1/32"		
DECIMAL: ± .005"		
X: ± .003"		
XX: ± .030"		
XXX OR .000: ± .015"		
DRILL SIZES: ± .015"		
ANGULAR: ± 1°		
SURF FINISH: 125 MICRO		
THREADS: (2A AND 2B)		
DRAWN BY: TSH		
APPD BY:		
DATE: 05/17/92		
TITLE: COBRA AIR BRAKE CONTROL SYSTEM ASSEMBLY		
DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		
DRAWING NUMBER: 818400		
REV: C		

ITEM	PART NO.	QTY	DESCRIPTION
1	78703	1	AIR TOGGLE VALVE, TWO CIRCUIT BENDIX TW-2
2	818490	1	VALVE, AIR RELAY (MIDLAND KN28500)
3	818499	4	90 DEGREE FITTING, 3/8 JIC MALE TO 3/8 NPT MALE
4	818498	1	3/8 NPT MALE NIPPLE
5	818488	1	VALVE, BRASS BALL (3/8" - PBV500P-6)
6	818492	1	HOSE, AIR LINE, FRONT LH W/ SPRING GUARD (H06906 X 62")
7	818494	1	HOSE, AIR LINE, FRONT RH W/ SPRING GUARD (H06906 X 75")
8	78798	2	BRAKE CHAMBER, TYPE 24 COMBO (NOT PROVIDED SHOWN FOR REF.)

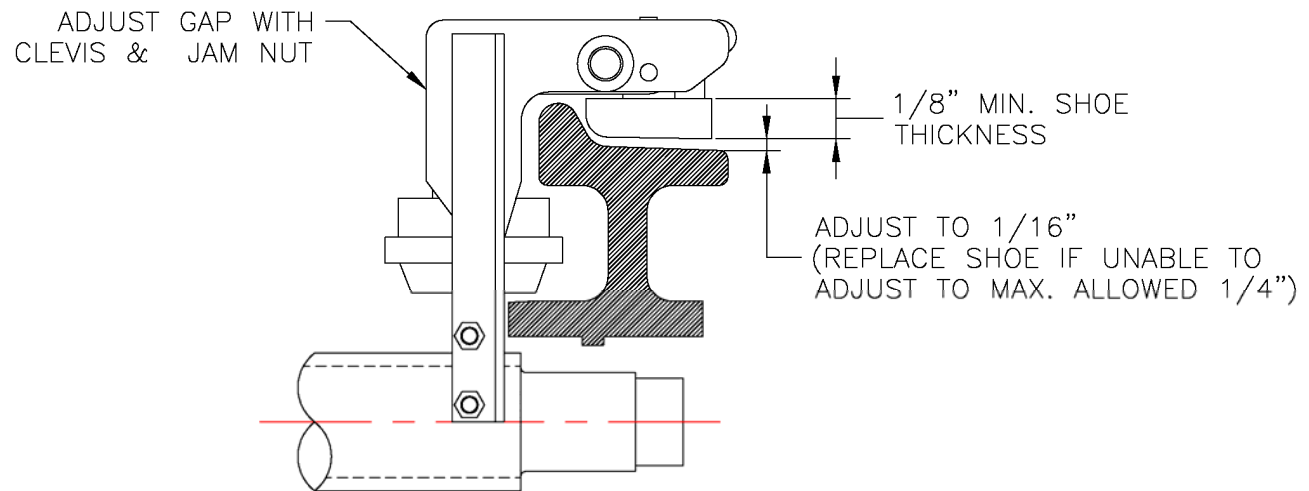


SEE DRAWING 818400 FOR REAR BRAKES AND PART NUMBERS FOR OTHER COMPONENTS

	-	-	-	-
	-	-	-	-
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX OR .XXXX ± .005 DRILL SIZES: + .015 ANGULAR: ± 1° SURF. FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP CORNERS (0.005 X 45° MAX.)				
DRAWN BY: BJF		APPD BY:		TITLE: AIR BRAKE CONTROL KIT FOR BEHIND CAB GEAR
DATE: 7/17/13		DRAWING NUMBER: 78701		REV: #

### 5.3.6 Inspection and Adjustment

Inspect and adjust brake shoes per Figure 5.3.6.



FILENAME: M1630131

**Figure 5.3.6** Brake Inspection and Alignment

### 5.3.7 Testing

Operate the vehicle on a test track. With the "on/off" toggle valve "on" and the ball valve(s) open, check that:

- (1) when the vehicle brake pedal is depressed, the guide wheel brakes clamp the Rail wheel enough to begin slowing its rotation, but not enough to totally lock the Rail Wheel. The Rail Wheels should not be allowed to lock up since that will cause a flat spot on the wheel due to the sliding action on the rail.
- (2) the brakes properly release when the brake pedal is released.

If brakes do not function properly, contact a Service Representative at DMF.

**NOTE:**

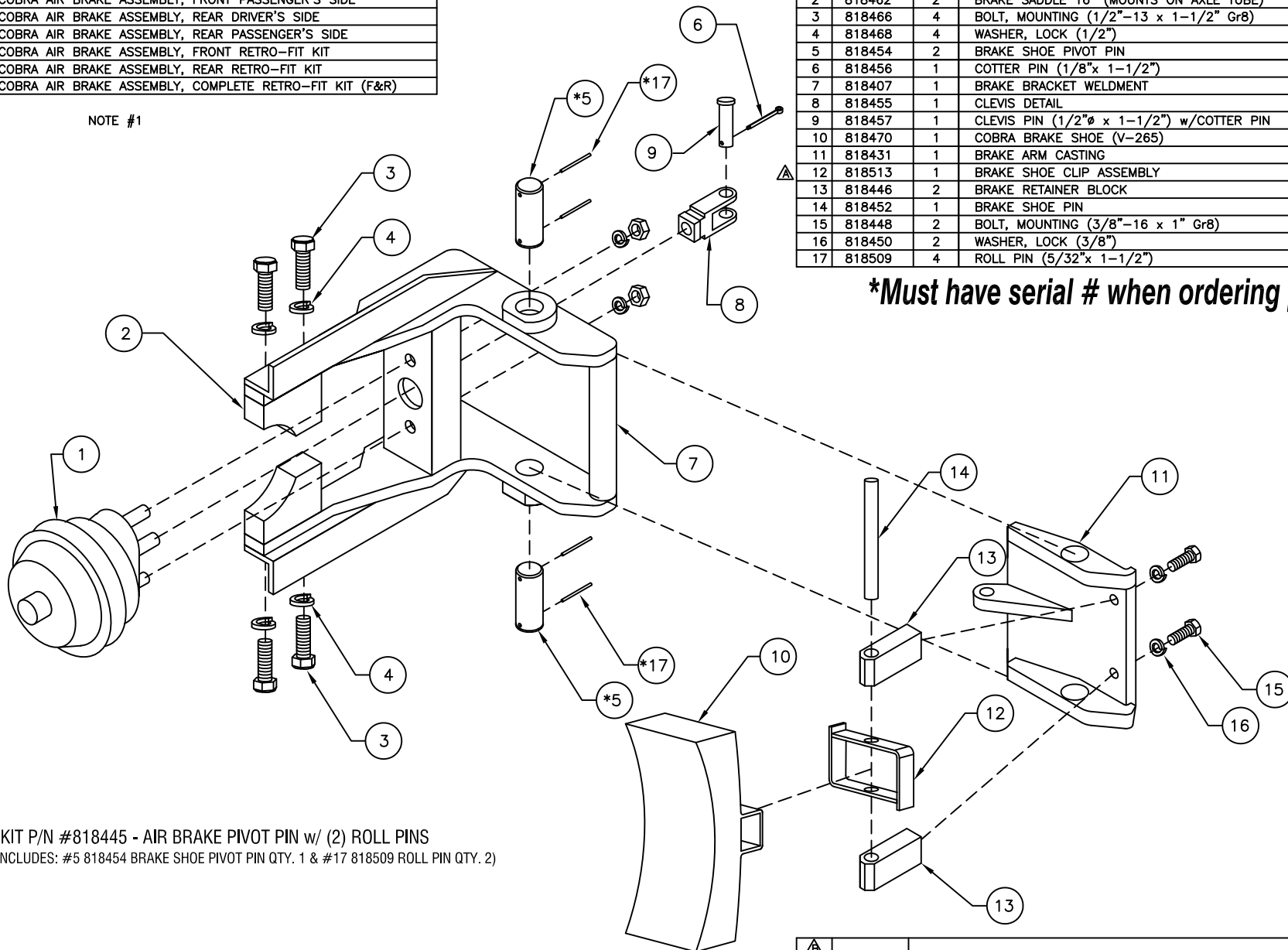
The rail wheel brake system is intended to assist the existing vehicle brakes when in the rail mode. As the vehicle rear tires are in contact with the railhead, the primary braking effort is derived from the rubber tires. Rail wheel brakes alone are insufficient to stop the vehicle in a reasonable distance.

### 5.3.8 Brake Parts

See drawing on next page for brake parts schematic.

PART NO.	DESCRIPTION
818396	COBRA AIR BRAKE ASSEMBLY, FRONT DRIVER'S SIDE
818397	COBRA AIR BRAKE ASSEMBLY, FRONT PASSENGER'S SIDE
818398	COBRA AIR BRAKE ASSEMBLY, REAR DRIVER'S SIDE
818399	COBRA AIR BRAKE ASSEMBLY, REAR PASSENGER'S SIDE
818410	COBRA AIR BRAKE ASSEMBLY, FRONT RETRO-FIT KIT
818411	COBRA AIR BRAKE ASSEMBLY, REAR RETRO-FIT KIT
818417	COBRA AIR BRAKE ASSEMBLY, COMPLETE RETRO-FIT KIT (F&R)

NOTE #1



\*KIT P/N #818445 - AIR BRAKE PIVOT PIN w/ (2) ROLL PINS  
(INCLUDES: #5 818454 BRAKE SHOE PIVOT PIN QTY. 1 & #17 818509 ROLL PIN QTY. 2)

NOTE #2

PART NO.	DESCRIPTION
818458	AIR BRAKE CHAMBER, FRONT DRIVER'S SIDE
818459	AIR BRAKE CHAMBER, FRONT PASSENGER'S SIDE
818460	AIR BRAKE CHAMBER, REAR DRIVER'S SIDE
818461	AIR BRAKE CHAMBER, REAR PASSENGER'S SIDE

ITEM	PART NO.	QTY	DESCRIPTION
1	NOTE #2	1	AIR BRAKE CHAMBER, FRONT (SEE NOTE #2)
2	818462	2	BRAKE SADDLE 16" (MOUNTS ON AXLE TUBE)
3	818466	4	BOLT, MOUNTING (1/2"-13 x 1-1/2" Gr8)
4	818468	4	WASHER, LOCK (1/2")
5	818454	2	BRAKE SHOE PIVOT PIN
6	818456	1	COTTER PIN (1/8"x 1-1/2")
7	818407	1	BRAKE BRACKET WELDMENT
8	818455	1	CLEVIS DETAIL
9	818457	1	CLEVIS PIN (1/2"Ø x 1-1/2") w/COTTER PIN
10	818470	1	COBRA BRAKE SHOE (V-265)
11	818431	1	BRAKE ARM CASTING
12	818513	1	BRAKE SHOE CLIP ASSEMBLY
13	818446	2	BRAKE RETAINER BLOCK
14	818452	1	BRAKE SHOE PIN
15	818448	2	BOLT, MOUNTING (3/8"-16 x 1" Gr8)
16	818450	2	WASHER, LOCK (3/8")
17	818509	4	ROLL PIN (5/32"x 1-1/2")

**\*Must have serial # when ordering parts\***

REV	DATE	DESCRIPTION	BY	APP
3/26/12	818513 WAS 818426		JDI	
TOLERANCES:				
(UNLESS SPECIFIED)				
COMMON SENSE PREVAILS				
FRAC. MACH: ± 1/32"				
FRAC. OTHER: ± 1/16"				
X .003				
.XX .030				
.XXX OR .XXX .005				
DRILL SIZES: ± .015				
ANGULAR: ± 1°				
SURF FINISH: 125 MICRO				
THREADS: 12A AND 2B				
MFG: SHAW-WORTH CO. & S. 100 S. 400 S. 100 S. 1				
DRAWN BY: JBG		APPD BY:		DATE: 1/25/10
				DRAWING NUMBER: M1630101
				REV: A

## 5.4 TWO-PIECE WHEELS

DMF offers a two-piece, insulated wheel option for extreme applications, such as material handlers. If your material handler will be insulated, then DMF requires the use of our two-piece wheel.

DMF's two-piece wheels require additional maintenance (over and above our standard wheels), so we only recommend them for use in heavy-duty applications. The additional maintenance procedures center around proper monitoring of the torque of the 8 bolts holding the tread and hub together. To assist in monitoring the torque of these bolts, DMF has provided "Loose Wheel-Nut Indicators" (also referred to as torque indicators) on all 8 bolts. See the following checklist for additional maintenance procedures.

Additional Checklist for Two-Piece Wheels:

In addition to following the inspection and maintenance procedures as defined in Section 3.1, Two-Piece Wheels require the following specific inspections:

- As previously specified in Section 3.1.1, check the bolt torque indicators (the tabs around each bolt) daily to ensure that they have not moved. If torque indicators are missing or damaged, please contact DMF for replacements. If torque indicators have moved, follow the procedure below to remedy the situation:
  1. Remove the green torque indicator. Re-torque the loose nut (see torque specifications in drawing M1630106 on the next page) and then replace with a red torque indicator (DMF provides one red torque indicator per wheel). To install a torque indicator, place it over the nut with the raised collar resting against the wheel. Push with both thumbs or a socket flush to the wheel.
  2. The next time that the vehicle is in a shop for service or repair, disassemble the wheel and inspect all the components for damage. Replace damaged or worn components and re-assemble the wheel with new bolts, nuts, and washers. See drawing M1630106 on the next page for the type of hardware required and the torque spec.

Nuts, bolts, and washers may only be used once. If the wheel is disassembled, all of the nuts, bolts, and washers must be replaced.

Please contact DMF if you have any questions regarding our two-piece wheels.

## RW-1650 2-PC. WHEEL PARTS:

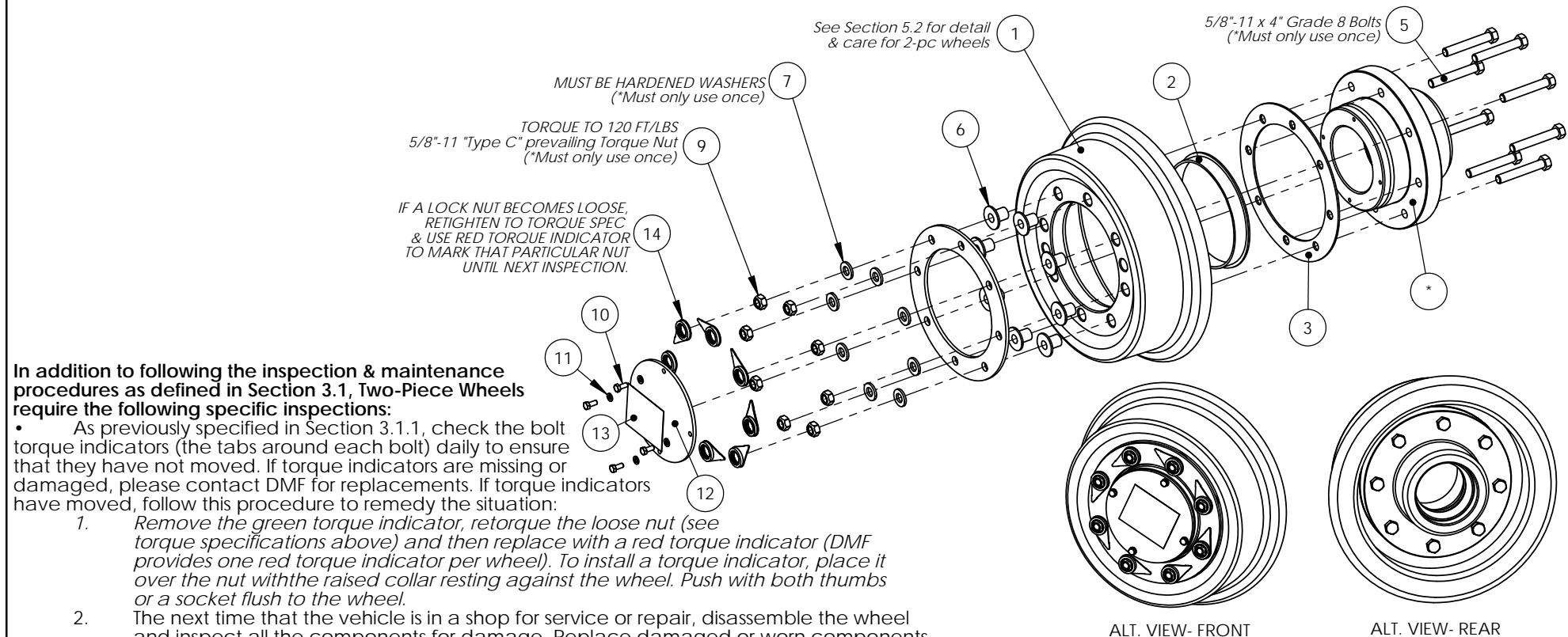
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	820475	1	HUB WITH RACES, RW-1650 2-PC WHEEL
	820490	1	RW-1650 2-PC. WHEEL HUB DETAIL
	800125	2	RW-1650 BEARING RACE (TIMKEN-6420)
2	820478	1	2-PC. WHEEL FIBER SPACER RING
3	820482	1	FIBER RING WHEEL INSULATOR DETAIL
4	820521	1	RW-1650 2-PC WHEEL TREAD, POST HEAT TREAT
5	820480	8	FIBER BOLT COLLAR, 2-PC. WHEEL
6	820485	8	2-PC. WHEEL, HARDENED 5/8" FLAT WASHER
7	820487	8	NUT, LOCK (LN5/8-11 TYPE "C")
8	820441	1	HUBCAP, 1650 - 7" B.C. (FLAT)
9	800109	4	5/16" LOCK WASHER, GRADE 8
10	800108	4	HUBCAP BOLTS (HHCS 5/16"-18 X 3/4")
11	820486	8	HHCS 5/8-11 UNC x 4", GRADE 8
12	820484	1	STEEL WASHER RING, 2 PIECE WHEEL
13	800300	1	DECAL, 2-PC. WHEEL RW-1630/50 INSPECTIONS
14	800301	8	KIT, 2-PC. WHEEL INDICATORS (8 GREEN/1 RED)

P/N #800021 - ALL HARDWARE KIT FOR RW-1650 WHEEL (see drawing M1650103 in Section 5.3)

## RW-1630 2-PC. WHEEL PARTS:

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	820492	1	RW-1630 2-PC. WHEEL TREAD DETAIL
2	820482	1	FIBER RING WHEEL INSULATOR DETAIL
3	820478	1	2-PC. WHEEL FIBER SPACER RING
4	820483	1	RW-1630 2-PC. HUB DETAIL W/ QTY. 2 RACE BEARINGS
	820482	1	RW-1630 2-PC. WHEEL HUB DETAIL
	800101	2	RW-1630 BEARING RACE (TIMKEN-563)
5	820486	8	2 PC. WHL HEX BOLT (HHCS5/8-11 X 4.00" GR8)
6	820480	8	FIBER BOLT COLLAR, 2-PC. WHEEL
7	820485	8	2-PC. WHEEL, HARDENED 5/8" FLAT WASHER
8	820484	1	STEEL WASHER RING, 2 PIECE WHEEL
9	820487	8	NUT, LOCK (LN5/8-11 TYPE "C")
10	800108	4	HUBCAP BOLTS (HHCS 5/16"-18 X 3/4")
11	800109	4	HUBCAP LOCK WASHERS (LW-5/16")
12	820441	1	HUBCAP, 1650 - 7" B.C. (FLAT)
13	800300	1	DECAL, 2-PC. WHEEL RW-1630/50 INSPECTIONS
14	800301	1	KIT, RW-1630/50 2-PC. WHEEL 23.8MM INDICATORS

P/N #800020 - ALL HARDWARE KIT FOR RW-1630 WHEEL (see drawing M1630103 in Section 5.3)



In addition to following the inspection & maintenance procedures as defined in Section 3.1, Two-Piece Wheels require the following specific inspections:

- As previously specified in Section 3.1.1, check the bolt torque indicators (the tabs around each bolt) daily to ensure that they have not moved. If torque indicators are missing or damaged, please contact DMF for replacements. If torque indicators have moved, follow this procedure to remedy the situation:
  - Remove the green torque indicator, retorque the loose nut (see torque specifications above) and then replace with a red torque indicator (DMF provides one red torque indicator per wheel). To install a torque indicator, place it over the nut with the raised collar resting against the wheel. Push with both thumbs or a socket flush to the wheel.
  - The next time that the vehicle is in a shop for service or repair, disassemble the wheel and inspect all the components for damage. Replace damaged or worn components and re-assemble the wheel with new bolts, nuts, and washers. See above for the type of hardware required and the torque specifications.

- Nuts, bolts, and washers may only be used once. If the wheel is disassembled, all of the nuts, bolts, and washers must be replaced.

<div><div></div><div></div></div>		-			-								
<div><div></div><div></div></div>		5/2/12	UPDATED TO CURRENT MANUAL REVISION			JDI							
REV		DATE	DESCRIPTION			BY APP							
TOLERANCES: (UNLESS SPECIFIED)		RW-1630/50		TITLE:  RW-1630/50 INSULATED 2-PC. WHEEL ASSY.									
FRAC. MACH: ± 1/32"													
FRAC. OTHER: ± 1/16"													
X ± .063													
XX ± .030													
XXX ± .005													
DRILL SIZES: ± .015													
ANGULAR: ± 1"													
SURF FINISH: 125 MICRO													
THREADS: 2A AND 2B		DRAWN BY: JBG		APPD BY:		DATE: 4/6/2010		<div><div></div><div></div></div>		DRAWING NUMBER: M1630106		REV: A	
REDA UNAPPROVED (CIRCLE & REMOVE)													

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# SECTION 6.0    HYDRAULIC SYSTEM

- 6.1    **HYDRAULIC SYSTEM..... 6-2**
  - 6.1.1    New Hydraulic System for Vehicle without Hydraulic System.....6-2
  - 6.1.2    Hydraulic System for Multiple Uses (Railgear and other Application(s)).....6-2
  - 6.1.3    Hydraulic System Installation Continued .....6-3
- 6.2    **VALVE ASSEMBLIES AND HYDRAULIC SCHEMATICS ..... 6-4**
- 6.3    **RW-1630/50 DRIVER SIDE REAR LOCKING VALVE CYLINDER ASSEMBLY ..... 6-5**
- 6.4    **RW-1630/50 PASSENGER SIDE REAR LOCKING VALVE CYLINDER ASSEMBLY.... 6-6**
- 6.5    **RW-1630 DRIVER SIDE REAR LOCKING VALVE CYLINDER – EXTRA SHORT..... 6-7**
- 6.6    **RW-1630 PASSENGER SIDE REAR LOCKING VALVE CYLINDER – EXTRA SHORT . 6-8**
- 6.7    **RW-1630 FRONT HYDRAULIC CYLINDER ASSEMBLY ..... 6-9**
- 6.8    **CYLINDER ASSEMBLY PROCEDURES ..... 6-10**
- 6.9    **JIC FITTING INSTALLATION..... 6-11**
- 6.10    **O-RING FITTING INSTALLATION..... 6-12**
- 6.11    **PIPE FITTING INSTALLATION ..... 6-13**

## 6.1 HYDRAULIC SYSTEM

**NOTE:**

DMF only provides hydraulic hoses from front and rear control valves to Railgear cylinders. Customer is responsible for all other system components (tank, diverter, PTO, pump, filter, pressure relief valve, etc.)

### 6.1.1 New Hydraulic System for Vehicle without Hydraulic System

If only DMF Railgear is to be installed and there is not an existing hydraulic system, outfit the truck with a 5 to 7 GPM, 2500 psi pump, suction filter (such as a Vickers OFSS-10), with an appropriate sized reservoir. The tank should have a minimum of (1) one suction port (3/4 NPT), (1) one 1/2" NPT return and a tank filler breather. Fill the tank with Unax RX-46 hydraulic oil (or equivalent). If other equipment is to be installed in addition to your DMF Railgear, you will need to adjust your tank specifications accordingly.

Once your new hydraulic system is installed, if your vehicle is going to have multiple applications for the hydraulic system, please proceed to Section 6.1.2 for instructions on installing a diverter valve.

### 6.1.2 Hydraulic System for Multiple Uses (Railgear and other application(s))

If the truck has an existing hydraulic system, you must first install an appropriately sized pressure relief valve in the pressure line after the pump. Install an appropriate sized diverter valve (depending on pump volume) in the pressure line after the pressure relief valve and before any existing equipment. One diverter outlet routes to the existing equipment's valves, the other diverter outlet routes to the front Railgear. See Section 6.2 for additional information on installation of the pressure relief valve and diverter valve.

**\*\*\*\*WARNING\*\*\*\***

Railgear control valves have built-in pressure reliefs and the hydraulic working pressure of the system is 2500 psi. The front valve should be set to 2250 psi at the relief. The rear valves should be set to 2000 psi and all other parts supplied by DMF are rated to 2500 psi. Care must be exercised that the relief in any of the valves is not inadvertently exceeded. It is possible for a relief to be adjusted much higher than its valve can withstand. To ensure correct system pressure, check with a gauge.

### 6.1.3 Hydraulic System Installation Continued

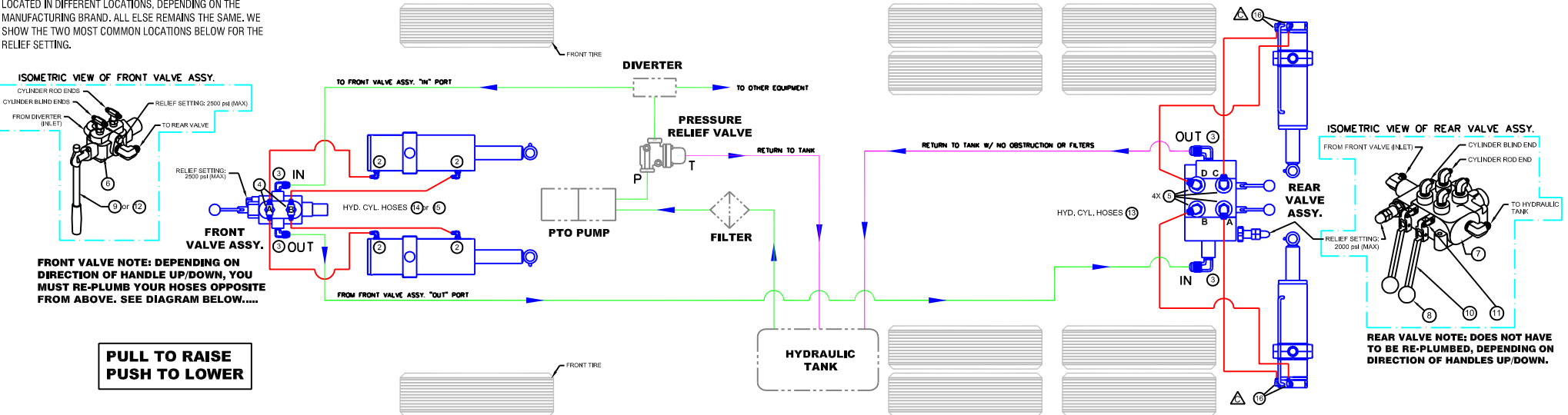
From the output side of the Pressure Relief valve (or the Diverter valve, if appropriate), route a pressure line (SAE 100R2-8 and #8 JIC swivels at each end) to the center of the front bumper. Connect the pressure line to the "IN" port of the front Railgear valve. From the "OUT" port of the front Railgear valve, route a pressure line (SAE 100R2-8 and #8 JIC swivels at each end) to the "IN" port of the rear Railgear valve. Lastly, run a hydraulic line from the "OUT" port of the rear Railgear to the tank, ensuring that there are no obstructions, such as filters or other equipment. The remaining ports on the front and rear valve assemblies connect to the Railgear cylinders with SAE 100R1-4 hose and #4 JIC swivels. The rear cylinder hydraulic hoses are pre-installed at the factory. Check that proper hose clearance is obtained to avoid chafing and shield hoses if necessary.

**\*\*\*\*WARNING\*\*\*\***

Be certain that the front and rear valves are plumbed correctly. Each valve port is marked "IN" or "OUT". Plumbing the valves backward will cause an unsafe condition, resulting in possible injury and/or damage.

**NOTE: DMF ONLY PROVIDES HYDRAULIC HOSES FROM FRONT & REAR CONTROL VALVES TO RAILGEAR CYLINDERS. CUSTOMER IS RESPONSIBLE FOR ALL OTHER SYSTEM COMPONENTS (TANK, DIVERTER, PTO, PUMP, FILTER, PRESSURE RELIEF VALVE, ETC.)**

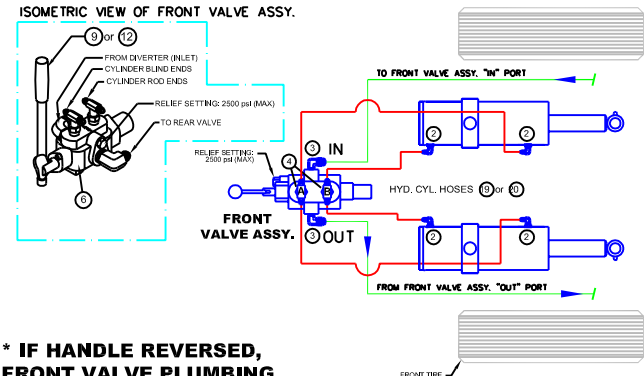
NOTE: ON THE FRONT VALVE THE RELIEF SETTING MAY BE LOCATED IN DIFFERENT LOCATIONS, DEPENDING ON THE MANUFACTURING BRAND. ALL ELSE REMAINS THE SAME. WE SHOW THE TWO MOST COMMON LOCATIONS BELOW FOR THE RELIEF SETTING.



ITEM	PART NO.	QTY	DESCRIPTION
1	(REF.)	1	PUMP (EXISTING) 5 to 7 gpm @ 2000 psi MINIMUM
2	241006	4	FITTING, ELBOW (#04 JIC x #06 SAE O-RING)
3	810302	4	FITTING, ELBOW (3/4" MPT x #08 JIC)
4	810308	4	FITTING, TEE (1/4" NPT x #04 JIC x #04 JIC)
5	810310	6	FITTING, ELBOW (1/2" MPT x #04 JIC)
6	810204	(REF.)	VALVE ASSEMBLY, FRONT; VALVE w/FITTINGS
7	810210	(REF.)	VALVE ASSEMBLY, REAR; VALVE w/FITTINGS
8	810214	(REF.)	VALVE HANDLE, REPLACEMENT; w/LINK KIT
9	810215	(REF.)	VALVE HANDLE, REPLACEMENT; ASSEMBLY
10	810217	(REF.)	VALVE HANDLE, REPLACEMENT; (HANDLE ONLY)

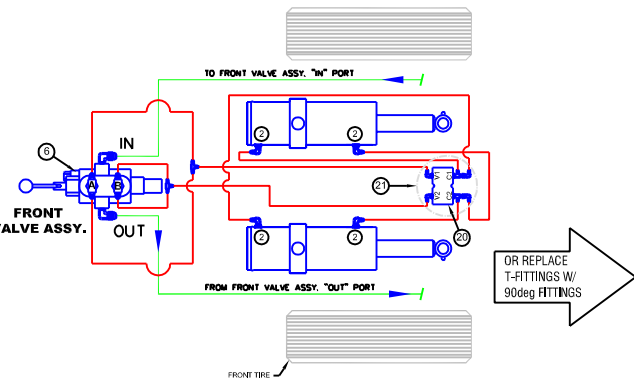
ITEM	PART NO.	QTY	DESCRIPTION
11	810218	(REF.)	VALVE HANDLE, REPLACEMENT; (LINK KIT ONLY)
12	810219	(REF.)	VALVE HANDLE BRACKET, REPLACEMENT;
13	810615	(REF.)	HYD.CYL.HOSES,96" (qty. 4)(#04 w/#04JIC SWIVEL)
14	810630	(REF.)	HYD.CYL.HOSES,36" (qty. 4)(#04 w/#04JIC SWIVEL)
15	810640	(REF.)	HYD.CYL.HOSES,62" (qty. 4)(#04 w/#04JIC SWIVEL)
16	240258	4	#4 MJIC X #3 MORB 90 DEG, ELBOW (6801-04-03-NWQ-FG)
17			
18			
19	810205	1	VALVE ASSEMBLY, FRONT, W/ 90deg FITTINGS
20	600603	(REF.)	LOCKING VALVE (DPC1-10-P-6T)
21	600606	(REF.)	LOCKING VALVE W/ FITTINGS

**PLUMBING FOR REVERSED HANDLE ONLY \***

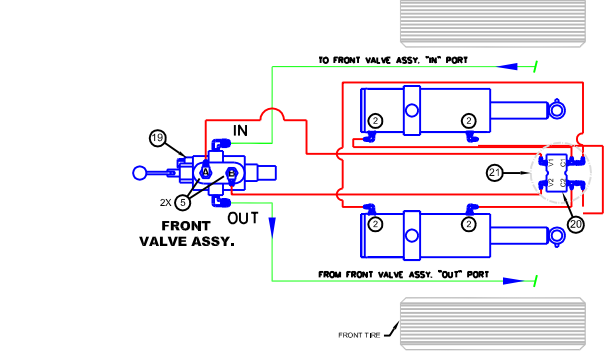


**\* IF HANDLE REVERSED, FRONT VALVE PLUMBING MUST BE REVERSED**

**PLUMBING FOR EXTERNAL LOCKING VALVE WITH T FITTINGS ON FRONT VALVE (STD. HANDLE)**







**PLUMBING FOR EXTERNAL LOCKING VALVE W/ 90deg FITTINGS ON FRONT VALVE (STD. HANDLE)**



**SEE SECTION 4.3 OF MANUAL WHICH SPECIFIES HYDRAULIC SYSTEM REQUIREMENTS**

**LUBRICATION SPECIFICATIONS**

**HYDRAULIC OIL:**  
\* **ASTM D6158 HM (UNAX RX-46 HYDRAULIC OIL, SHELL TELLUS EE 46 OR EQUAL)**  
**OR**  
\* **SOME CUSTOMERS OPERATE ON DEXRON III ATF**

	5/9/11	CORRECTED SECTION REFERENCE		NEH	
	9/20/10	DELETED P/N'S 810311, 810312, & 810313 & ADDED 240258		JBG	
	9/09/09	REVISED SCHEMATIC LAYOUT AND B.O.M. PER AS BUILT NOW		JBG	
	7/30/09	REVISED BY REMOVING TYPE OF VALVES ENERGY/GREEN		JBG	
REV	DATE	DESCRIPTION		BY	APP
TOLERANCES:		TITLE:  VALVE ASSEMBLIES & HYDRAULIC SCHEMATIC  DIVERSIFIED METAL FABRICATORS, INC.(404)875-1512			
(UNLESS SPECIFIED)					
DIMENSIONS PER AISI		DRAWN BY: KLC			
FRACTIONAL: 1/16"					
DECIMAL: .005		DATE: 10/07/98			
X .XX					
XXX OR .XXX		DRAWING NUMBER: M1630114			
DRILL SIZES:					
ANGULAR:					
SURF FINISH:					
THREADS:					
BREAK SHARP EDGES					

**DMF P/N 240225 - SEAL KIT**  
**(SEAL KIT INCLUDES ITEM #'s 4,5,6,7,8 & 9)**

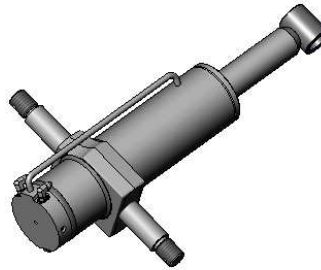
**TO DETERMINE DRIVER SIDE VS. PASSENGER SIDE**

DUE TO WEIGHT OF CYLINDERS, PLACE CYLINDER ON THE FLOOR OR TABLE FIRST. THEN POSITION THE CYLINDER AS IF YOU WERE HOLDING THE BASE END IN YOUR LEFT HAND AND THE ROD END IN YOUR RIGHT HAND. WITH IT POSITIONED AS SUCH, LOOKING AT THE 3 FITTINGS/TUBES CONNECTED TO BASE OF CYLINDER:

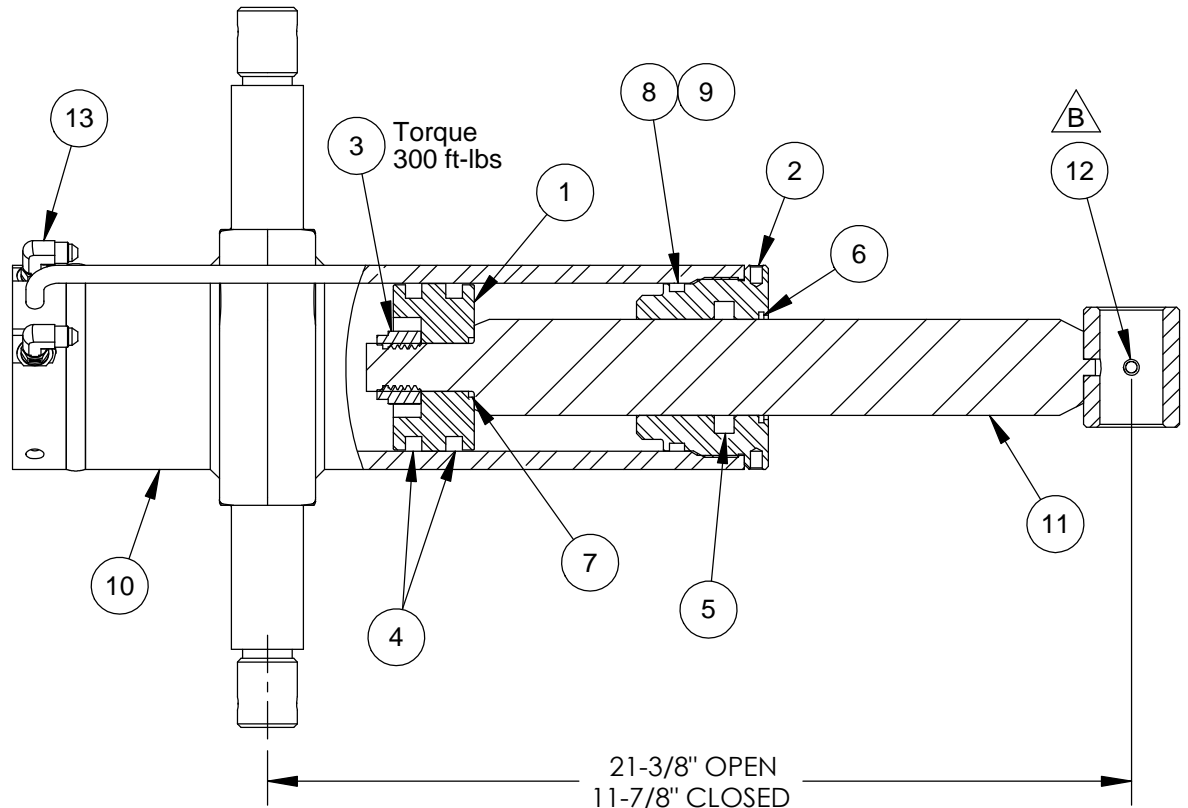
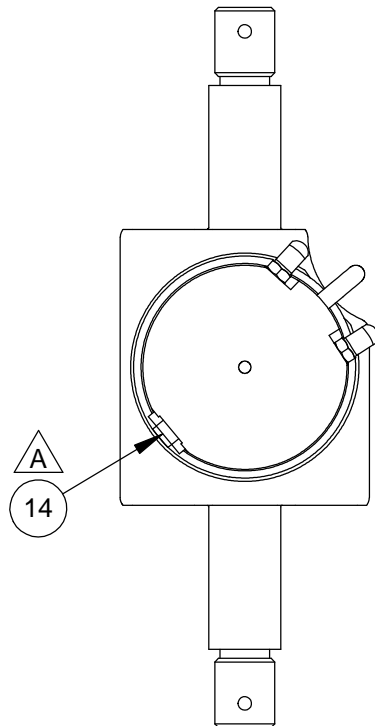
\*IF THE TUBES ARE FACING YOU (OR CLOSEST TO YOU), THEN IT IS A DRIVER SIDE CYLINDER (DS) - PART # 240232




\*IF THE TUBES ARE FACING AWAY FROM YOU, THEN IT IS A PASSENGER SIDE CYLINDER (PS) - PART # 240231

**SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE**



ITEM	PART NO.	QTY	DESCRIPTION
1	240246	1	HYDRAULIC CYLINDER PISTON, LVLV, 3-1/2"
2	240202	1	HYDRAULIC CYLINDER GLAND, 3-1/2"
3	240103	1	NYLOCK NUT, 1" - 14
4	240204	2	SEAL, PISTON, 3120-2875
5	240105	1	SEAL, ROD, 3750-2000
6	240106	1	WIPER, ROD, 959-21
7	240107	1	O-RING, PISTON, 2-214
8	240208	1	O-RING, GLAND, 2-338
9	240209	1	BACKUP RING, GLAND, 8-338
10	240254	1	WELD ASSY, 3-1/2" TUBE, SAE PORT LOCKING VALVE, RR, LH
11	240229	1	HYDRAULIC CYLINDER REAR ROD WELDMENT, LOCKING VALVE
12	818235	1	GREASE FITTING, 1/8" NPT, STRAIGHT
13	240258	2	90 DEGREE ELBOW - #4 MJIC x #3 SAE PORT, 6801-04-03
14	241016	1	PARKER LOCKING VALVE



	2/17/12	818235 WAS 240123		JTM						
	12/1/11	241016 WAS 241013		JTM						
REV	DATE	DESCRIPTION			BY	APP				
TOLERANCES: (UNLESS SPECIFIED):		<div>TITLE: CYLINDER, REAR, SAE PORT L'VLV, 3-1/2" BORE x 9-1/2" STROKE, LH - DRIVER SIDE</div> <div>DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512</div>								
FRAC. MACH: ± 1/32"										
FRAC. OTHER: ± 1/16"										
.XX ± .063										
.XXX ± .030										
.XXX ± .005										
DRILL SIZES: + .015										
ANGULAR: ± 1°										
SURF FINISH: 125 MICRO										
THREADS: 2A AND 2B										
REMARKS: DIMENSIONS CLOSE TO APPROX.										
DRAWN BY:	BJF	APPD BY:		DATE:	10/7/09		DRAWING NUMBER:	240256	REV:	B

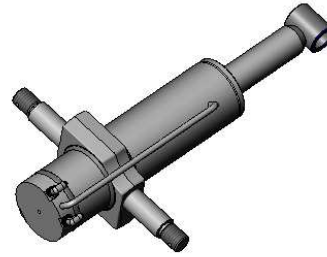
**(SEAL KIT INCLUDES ITEM #'s 4,5,6,7,8 & 9)  
DMF P/N 240225 - SEAL KIT**

**TO DETERMINE DRIVER SIDE VS. PASSENGER SIDE**

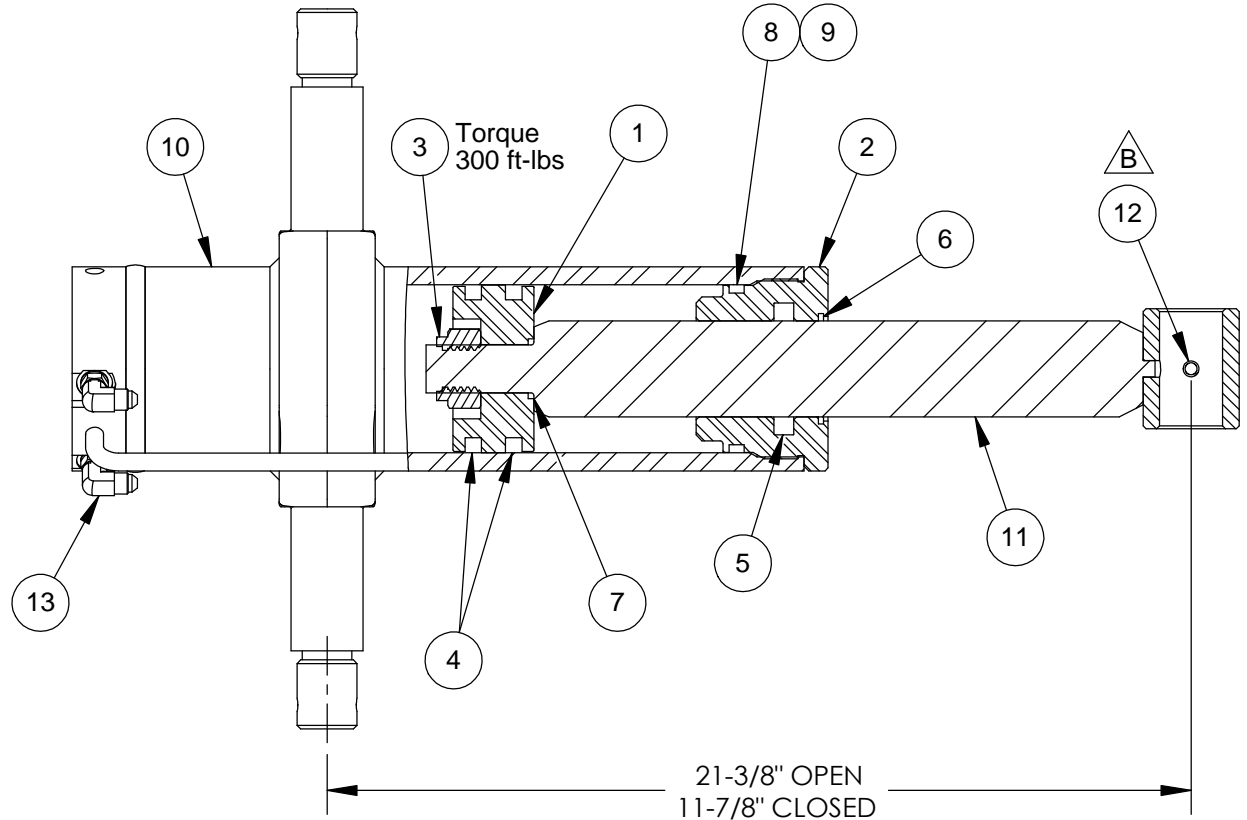
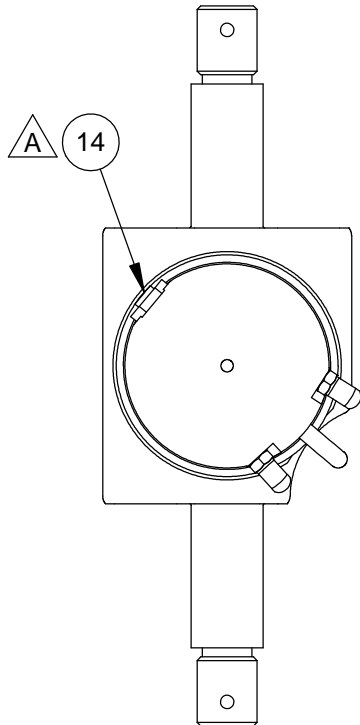
DUE TO WEIGHT OF CYLINDERS, PLACE CYLINDER ON THE FLOOR OR TABLE FIRST. THEN POSITION THE CYLINDER AS IF YOU WERE HOLDING THE BASE END IN YOUR LEFT HAND AND THE ROD END IN YOUR RIGHT HAND. WITH IT POSITIONED AS SUCH, LOOKING AT THE 3 FITTINGS/TUBES CONNECTED TO BASE OF CYLINDER:




\*IF THE TUBES ARE FACING YOU (OR CLOSEST TO YOU), THEN IT IS A DRIVER SIDE CYLINDER (DS) - PART # 240232

\*IF THE TUBES ARE FACING AWAY FROM YOU, THEN IT IS A PASSENGER SIDE CYLINDER (PS) - PART # 240231



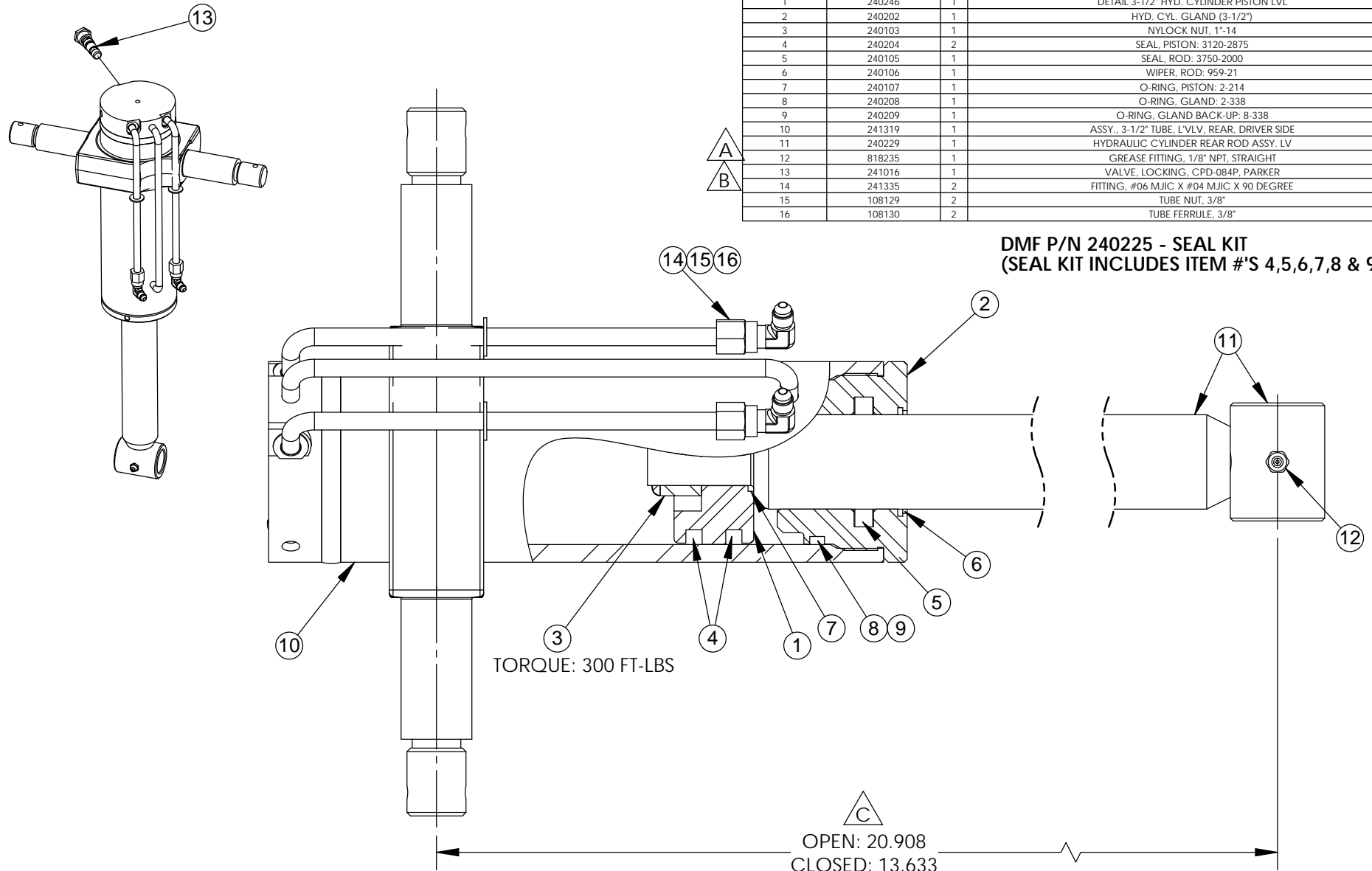
ITEM	PART NO.	QTY	DESCRIPTION
1	240246	1	HYDRAULIC CYLINDER PISTON, LVLV, 3-1/2"
2	240202	1	HYDRAULIC CYLINDER GLAND, 3-1/2"
3	240103	1	NYLOCK NUT, 1" - 14
4	240204	2	SEAL, PISTON, 3120-2875
5	240105	1	SEAL, ROD, 3750-2000
6	240106	1	WIPER, ROD, 959-21
7	240107	1	O-RING, PISTON, 2-214
8	240208	1	O-RING, GLAND, 2-338
9	240209	1	BACKUP RING, GLAND, 8-338
10	240255	1	WELD ASSY, 3-1/2" TUBE, SAE PORT LOCKING VALVE, RR, RH
11	240229	1	HYDRAULIC CYLINDER REAR ROD WELDMENT, LOCKING VALVE
12	818235	1	GREASE FITTING, 1/8" NPT, STRAIGHT
13	240258	2	90 DEGREE ELBOW - #4 MJIC x #3 SAE PORT, 6801-04-03
14	241016	1	PARKER LOCKING VALVE



	2/17/12	818235 WAS 240123	JTM	
	12/1/11	241016 WAS 240103	JTM	
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED)				
FRAC. MACH: ± 1/32"				
FRAC. OTHER: ± 1/16"				
X ± .063				
XX ± .030				
XXX ± .005				
DRILL SIZES: ± .015				
ANGULAR: ± 1°				
SURF FINISH: 125 MICRO				
THREADS: 2A AND 2B				
REMARKS (IMPROVED) (LSD) (V-LOT) (M-1)				
-		TITLE: CYLINDER, REAR, SAE PORT L'VLV, 3-1/2" BORE x 9-1/2" STROKE, RH - PASSENGER SIDE		
		DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512		
DRAWN BY:	APPD BY:	DATE:	DRAWING NUMBER:	REV:
BJF		10/7/09	240257	B
				

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	240246	1	DETAIL 3-1/2" HYD. CYLINDER PISTON LVL
2	240202	1	HYD. CYL. GLAND (3-1/2")
3	240103	1	NYLOCK NUT, 1"-14
4	240204	2	SEAL, PISTON: 3120-2875
5	240105	1	SEAL, ROD: 3750-2000
6	240106	1	WIPER, ROD: 959-21
7	240107	1	O-RING, PISTON: 2-214
8	240208	1	O-RING, GLAND: 2-338
9	240209	1	O-RING, GLAND BACK-UP: 8-338
10	241319	1	ASSY., 3-1/2" TUBE, L'VLV, REAR, DRIVER SIDE
11	240229	1	HYDRAULIC CYLINDER REAR ROD ASSY. LV
12	818235	1	GREASE FITTING, 1/8" NPT, STRAIGHT
13	241016	1	VALVE, LOCKING, CPD-084P, PARKER
14	241335	2	FITTING, #06 MJIC X #04 MJIC X 90 DEGREE
15	108129	2	TUBE NUT, 3/8"
16	108130	2	TUBE FERRULE, 3/8"

**DMF P/N 240225 - SEAL KIT**  
**(SEAL KIT INCLUDES ITEM #'S 4,5,6,7,8 & 9)**



SEE PP008 FOR CYLINDER  
 ASSEMBLY & TEST PROCEDURE

C	10/3/14	REDRAWN, OPEN 20.908 WAS OPEN 21.068	JDI	
B	4/6/12	818235 WAS 240123	JTM	
A	12/1/11	241016 WAS 241013	JDI	
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED)				
FRAC. MACH: ± 1/32"				
FRAC. OTHER: ± 1/16"				
.XX ± .063				
.XXX ± .030				
.XXX ± .005				
DRILL SIZES: ± .015				
ANGULAR: ± 1"				
SURF FINISH: 125 MICRO				
THREADS: 2A AND 2B				
RW-1630/50		TITLE: REAR EXTRA SHORT L'VLV CYLINDER ASSEMBLY (3-1/2" BORE X 2" ROD), DRIVER SIDE		
DRAWN BY: JBG		APPD BY: -		DATE: 9/11/09
		DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		DRAWING NUMBER: 241304
		REV: C		

**DMF P/N 240125 - SEAL KIT  
(SEAL KIT INCLUDES ITEM #'s 4,5,6,7,8 & 9)**

**TO DETERMINE DRIVER SIDE VS. PASSENGER SIDE**

DUE TO WEIGHT OF CYLINDERS, PLACE CYLINDER ON THE FLOOR OR TABLE FIRST. THEN POSITION THE CYLINDER (WITH FITTINGS POINTED TOWARDS YOU) AS IF YOU WERE HOLDING THE BASE END IN YOUR LEFT HAND AND THE ROD END IN YOUR RIGHT HAND. WITH IT POSITIONED AS SUCH, LOOKING AT THE ACTUAL FITTING ON THE BASE END:

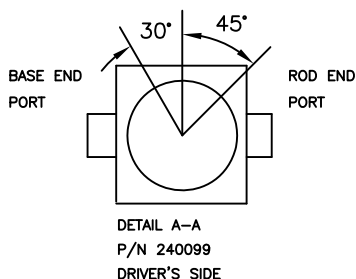
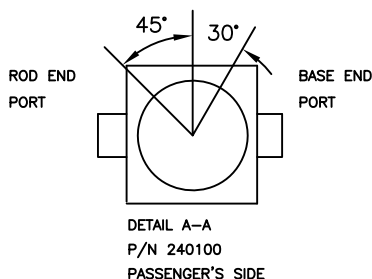
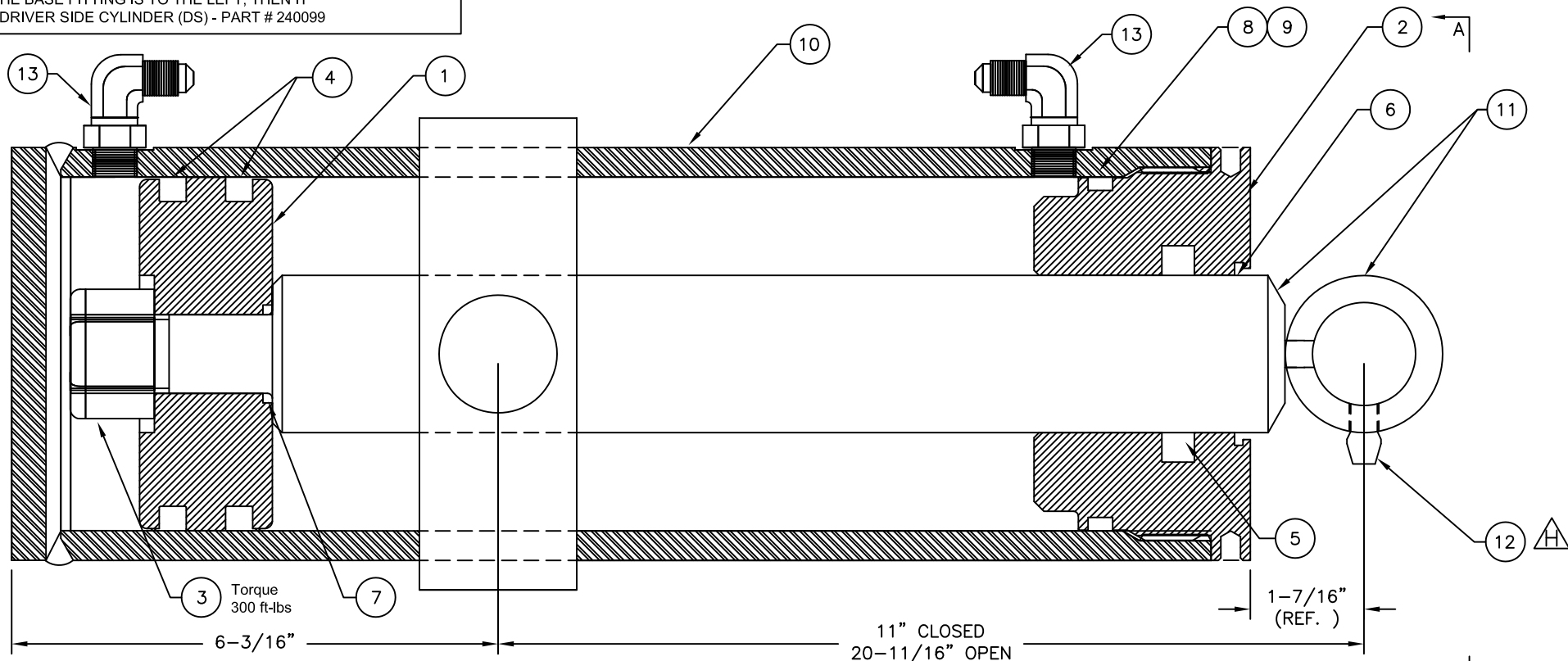
\*IF THE BASE FITTING IS TO THE RIGHT, THEN IT IS A PASSENGER SIDE CYLINDER (PS) - PART # 240100




\*IF THE BASE FITTING IS TO THE LEFT, THEN IT IS A DRIVER SIDE CYLINDER (DS) - PART # 240099

**SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE**

ITEM	PART NO.	QTY	DESCRIPTION
1	240101	1	PISTON: 4-1/2"
2	240102	1	GLAND: 4-1/2"
3	240103	1	NUT, NYLOCK: 1"-14
4	240104	2	SEAL, PISTON: 3120-3875
5	240105	1	SEAL, ROD: 3750-2000
6	240106	1	WIPER, ROD: 959-21
7	240107	1	O-RING, PISTON: 2-214
8	240108	1	O-RING, GLAND: 2-346
9	240109	1	O-RING, GLAND BACK-UP: 8-346
10	240110	1 or	BARREL ASSEMBLY: 4-1/2" (DRIVER'S SIDE)
	240115	1	BARREL ASSEMBLY: 4-1/2" (PASSENGER'S SIDE)
11	240120	1	ROD ASSEMBLY: 2"
12	818235	1	GREASE FITTING: 1/8" NPT
13	241006	2	FITTING, ELBOW: 1/4" JIC x 9/16"-18; 6801-NW-4-6



**1630/1420/1212/1019 FRONT CYLINDER**

⚠				
⚠	7/25/13	SWAPPED PASSENGER/DRIVER SIDE	JDI	
⚠	2/17/12	818235 WAS 240123	JTM	
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS		TITLE: RW-1630 FRONT HYDRAULIC CYLINDER ASSEMBLY (4-1/2"BORE x 2"ROD x 9-11/16"STROKE)		
FRAC. MACH: ± 1/32"		DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512		
FRAC. OTHER: ± 1/16"				
.X ± .063				
.XX ± .030				
.XXX OR .XXXX ± .005				
DRILL SIZES: + .015				
ANGULAR: ± 1°				
SURF FINISH: 125 MICRO				
THREADS: 12A AND 2B				
DRAWN BY: TSH		APPD BY:	DATE: 11/10/92	DRAWING NUMBER: 240099 DS/ 240100 PS
				REV: 1
BASIC DRUMP DIMS (3.000 X .400 X .400)				



TITLE: Cylinder Assembly

PURPOSE: To Establish Production Methods For The Assembly Of Cylinders

COMMON USAGE: All Models

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: D.M.F. Manufactured Hydraulic Cylinders With "PolyPack" Piston Seals

ASSEMBLY PROCEDURE:

PISTON: A) Inspect for sharp edges. Deburr as neccessary.

B) Clean and blow off with shop air.

C) Use Blue Assemblee Goo (19260) to aid in assembly.

D) Install two (2) seals with each lip (o'ring insert side) facing the closer piston face.

GLAND: A) Inspect OD and bore for sharp edges. Deburr as neccessary.

B) Clean and blow off with shop air.

C) Use Blue Assemblee Goo (19260) to aid in assembly.

D) Install wiper ring in bore with lip facing outboard.

E) Install seal in bore with lip (o'ring insert side) facing inboard.

F) Inspect for seal damage. Any shaved seal material requires replacement.

G) Install backing ring in O'ring groove on OD with concave surface facing inboard.

H) Install O'ring on inboard side of groove in Step G.

I) Inspect O'ring for damage.

ROD ASSEMBLY:

A) Clean and inspect shaft surface for scratches and dings.

B) Install grease fitting in rod end per PP001.

C) Use Blue Assemblee Goo (19260) to aid in assembly.

D) Install gland assembly onto rod with the outboard side facing the rod end.

E) Install rod O'ring onto threaded end of rod.

F) Inspect O'ring for damage.

G) Install piston assembly onto rod with the O'ring counterbore facing O'ring in Step E. Be certain that O'ring seats in counterbore.

H) Install self locking rod nut on rod. Tighten to 200 to 300 foot-pounds torque (Torque will vary based on rod & nut size).

CYLINDER ASSEMBLY:

A) Inspect cylinder ports for minimum three (3) threads and no burrs. Deburr as neccessary.

B) Clean tube ID threads and bore and blow out with shop air.

C) Inspect threads for debris.

D) Support cylinder barrel assembly with gland end facing up.

E) Maintain rod assembly in vertical position, align piston with tube bore, engage piston in tube bore, strike rod end with hammer until piston is below first cylinder port.

F) Slide gland down on rod, engage gland threads into barrel by hand.

G) Screw gland into barrel with spanner wrench until gland face contacts barrel tube-end.

H) Install two (2) hydraulic fittings into cylinder ports per PP003.

PRESSURE TESTING:

A) Connect hydraulic power unit to cylinder.

B) Operate cylinder through complete cycle to purge air and fill with clean hydraulic oil.





C) Operate cylinder to full extension and retraction and maintain at 3300 PSI for 15 seconds at each extent. While maintaining pressure at each extent, visually inspect ports, rod seal, gland OD seal, and cylinder bottom areas for leakage.

D) Disconnect hydraulic power unit and install caps on port fittings.

E) Impression stamp cylinder bottom when all preceding steps have been successfully accomplished.

COMMENTS: Specific assembly instructions on prints are performed with preference over this procedure.

**FOR CYLINDERS GREATER THAN Ø4.5", DO NOT ALLOW CYLINDER TO BOTTOM DURING TESTING. BLOCK ROD AGAINST GLAND WITH PIN AND 1" BLOCKS.**

	5/25/12	USE 19260 INSTEAD OF HYDRAULIC OIL	JDI	
	7/16/11	REMOVED CYLINDER PART #'S	NEH	
	9/27/07	ADDED CYLINDER TESTING WARNING	WAK	
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS		TITLE: PRODUCTION PROCEDURE 008 CYLINDER ASSEMBLY		
FRAC. MACH: ± 1/32"		DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		
FRAC. OTHER: ± 1/16"		DATE: 6/24/94		
.X ± .063				
.XX ± .030		DRAWING NUMBER: PP008		
XXX OR .XXXX ± .005		REV: C		
DRILL SIZES: + .015				
ANGULAR: ± 1°				
SURF FINISH: 125 MICRO				
THREADS: 1/2 AND 3/8				
DRAWN BY: WAK				
APPD BY:				

ITEM	PART NO.	QTY	DESCRIPTION
1			
2			

TITLE: SAE (JIC) 37 Degree Fitting Installation.

PURPOSE: To Establish Production Methods For The Installation Of SAE (JIC) Medium Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 4000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With SAE (JIC) 37 Degree Flared Ends.




PROCEDURE: A) Inspect fitting components to ensure that mating parts are free of burrs, nicks, scratches or any foreign material.

B) Align tube flare against nose of fitting body and screw on the nut, finger tight, clamping the tube flare between the fitting nose and the nut.

C) Tighten the nut the indicated Flats From Finger Tight (F.F.F.T.) listed in the chart below. Use a second wrench to hold the hose in proper alignment while tightening to avoid twisting the lay line. One flat on a hex is equal to 1/6th of a full turn. Tolerance on tightening is plus or minus 1/4 flat ( 1/24th of full turn).

### SAE (JIC) 37° Flare Fittings

Size	Thread Size	Tube Connection F.F.F.T.	Swivel Nut or Hose Connection F.F.F.T.
-4	7/16-20	2	2
-6	9/16-18	1.5	1.25
-8	3/4-16	1.5	1
-12	1 1/16-12	1.25	1
-16	1 5/16-12	1	1
-20	1 5/8-12	1	1
-24	1 7/8-12	1	1

					
					
REV	DATE	DESCRIPTION			BY APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX OR .XXX ± .005 DRILL SIZES: ± .005 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES				TITLE: PRODUCTION PROCEEDURE 005 JIC FITTING INSTALLATION DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512	
DRAWN BY:	APPD BY:	DATE:		DRAWING NUMBER:	REV:
TSH		06/02/94		PP005	#

ITEM	PART NO.	QTY	DESCRIPTION
1			
2			

TITLE: SAE O-Ring Fitting Installation

PURPOSE: To Establish Production Methods For The Installation Of O-Ring Medium And High Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 4000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With O-Ring Seals And SAE Straight Threads.

PROCEDURE:




- A) Inspect to ensure that both mating parts are free of burrs, nicks, scratches or any foreign particles.
- B) Lubricate O-Ring with light coat of system fluid or compatible oil.
- C) For adjustable fittings, back off lock nut as far as possible. Make sure back up washer is not loose and is pushed up to nut.
- D) Screw fitting into port until finger tight. Back up washer (adjustable) or hex face (non-adj.) should contact port face. Light wrenching may be necessary.
- E) To align an adjustable fitting, unscrew by desired amount but not more than one full turn. Use wrench to hold in position. Screw nut down to port face until finger tight.
- F) Tighten lock nut (adjustable) or fitting (non-adj.) the indicated Flats From Finger Tight (F.F.F.T.) in either the Adjustable chart or the Non-Adjustable chart below. One Flat on a hex is equal to 1/6th of a full turn. Tolerance on tightening is plus or minus 1/4 flat (1/24th of full turn).
- G) Inspect to ensure that O-Ring is not pinched and back up washer/hex seats flat on face of port.

#### ADJUSTABLE FITTINGS

Fitting Size	SAE Port Thread Size	F.F.F.T.
2	5/16-24	1.0
4	7/16-20	1.5
6	9/16-18	1.5
8	3/4-16	1.5
10	7/8-14	1.5
12	1 1/16-12	1.5
14	1 3/16-12	1.5
16	1 5/16-12	1.5
20	1 5/8-12	2.0
24	1 7/8-12	2.0

#### NON-ADJUSTABLE FITTINGS

Fitting Size	SAE Port Thread Size	F.F.F.T.
2	5/16-24	1.0
4	7/16-20	1.0
6	9/16-18	1.5
8	3/4-16	1.5
10	7/8-14	1.5
12	1 1/16-12	1.5
14	1 3/16-12	1.5
16	1 5/16-12	1.5
20	1 5/8-12	1.5
24	1 7/8-12	1.5

 					
REV	DATE	DESCRIPTION			BY APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: $\pm 1/32$ FRAC. OTHER: $\pm 1/16$ .X $\pm .063$ .XX $\pm .030$ .XXX OR .XXXX $\pm .005$ DRILL SIZES: $\pm .005$ ANGULAR: $\pm 1^\circ$ SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES		TITLE: PRODUCTION PROCEDURE 003 O-RING FITTING INSTALLATION DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		DATE: 06/02/94 	
DRAWN BY: TSH		APPD BY:		DRAWING NUMBER: PP003	REV: #

ITEM	PART NO.	QTY	DESCRIPTION
1			
2			

TITLE: National Pipe Thread (NPT) Fitting Installation.

PURPOSE: To Establish Production Methods For The Installation Of NPT Medium Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 3000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With Tapered Pipe Threads.

PROCEDURE: A) Inspect port components to ensure that male and female threads are free of nicks, burrs, dirt etc.

B) Apply sealant/lubricant to male pipe threads. Use only Permatex #14D "Thread Sealant With Teflon" paste (or Engineering approved equal). The first few threads must be left uncovered to avoid system contamination.


C) Screw fitting into female pipe port to the finger tight position.

D) Wrench tighten the fitting to the appropriate Turns From Finger Tight (T.F.F.T.) shown in chart below. Make sure that tube end of shaped fitting is aligned to receive in coming tube or hose assembly.

### STEEL PIPE THREAD FITTINGS

Fitting Size	Pipe Thread Size, NPT	T.F.F.T.
2	1/8-27	2.0-2.5
4	1/8-27	2.0-2.5
6	1/4-18	1.5-2.0
8	3/8-18	2.0-2.5
10	1/2-14	2.0-2.5
12	3/4-14	1.5-2.0
14	3/4-14	1.5-2.0
16	1-11 1/2	1.5-2.0
20	1 1/4-11 1/2	1.5-2.0
24	1 1/2-11 1/2	1.5-2.0

COMMENTS: Teflon Tape May Be Used In Certain Situations With Engineering Approval. A Pipe Fitting Is Limited To One Or Two Re-Uses.

REV		DATE	DESCRIPTION		BY	APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRACTIONAL: ± 1/32" DECIMAL: ± 1/16" X ± .063 XX ± .030 XXX OR .000 ± .005 DRILL SIZES: ± .005 ANGULAR: ± 1° SURF. FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES		DRAWN BY: TSH		APPD BY:	DATE: 06/02/94	
TITLE: PRODUCTION PROCEDURE 004 PIPE FITTING INSTALLATION			DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		DRAWING NUMBER: PP004	REV: #

# SECTION 7.0 REAR RAILGEAR PARTS

7.1 BEFORE ORDERING PARTS – REAR RAILGEAR..... 7-2

7.2 REAR PARTS DETAIL DRAWING..... 7-4

7.3 RW-1630 PIN-OFF ORIENTATION ..... 7-5

7.4 LINK DIMENSIONS ..... 7-6

7.5 EXTRA-SHORT LINKS..... 7-7

7.6 SHORT LINKS ..... 7-8

7.7 LONG LINKS ..... 7-9

7.8 RW-1630 WHEEL & REAR AXLE ASSEMBLY (DETAIL) ..... 7-10

7.9 RW-1630 STUB AXLE ASSEMBLY, REAR, DOUBLE INSULATED ..... 7-11

7.10 RW-1650 WHEEL & REAR AXLE ASSEMBLY (DETAIL) ..... 7-12

7.11 RW-1650 STUB AXLE ASSEMBLY, REAR, DOUBLE INSULATED ..... 7-13

7.12 REAR MOUNTING BRACKET – 12” ..... 7-14

7.13 REAR MOUNTING BRACKET – 10-3/4”..... 7-15

## 7.1 Before Ordering Parts – Rear Railgear

### Required Information for Ordering Parts:

- You must have the Railgear serial number when ordering parts. This uniquely identifies your Railgear, as it was built to your specifications, and also allows DMF to help you maintain a history of your Railgear. If you are placing a parts order through a maintenance facility, please inform them of the serial number, so that they can relay the information when placing your order.
- Returns: DMF has a Return Authorization Procedure. You must contact DMF for an RA# before returning any parts for any reason. Parts will not be credited without an RA#.
- Labor: In extremely rare situations, on a discretionary basis, and with prior approval, DMF will reimburse certain, specific labor costs. If you feel this may apply in your situation, you must contact DMF's Service Department for a Service Authorization Number (SA#). No labor will be reimbursed without an SA#. The SA# must be included on your request for reimbursement.
- Please use driver's side / passenger's side terminology (instead of left/right side) when describing issues with your Railgear. This ensures that everyone involved is clear about where the issue is occurring.

### Other Considerations for Ordering Parts:

This is a list of considerations to make before placing a parts order with DMF. There are many variations and customer requirements that we strive to accommodate, and as a result, the more information you can provide to us when placing an order, the more likely that we will be able to help you quickly and efficiently.

### Wheels:

- If you are a customer using special wheel profiles (this is especially prevalent in Metros), please be sure to inform the DMF Parts Department that there may be a special wheel profile involved in your order.
- DMF offers both insulated and non-insulated wheels – Please confirm which wheel you need before ordering. Insulated wheels can be identified by a grooved ring machined around the inside of the Rail wheel. This grooved ring can be seen and felt, and is located about an inch in from the outside tread.

### Links:

- DMF's links come in 3 sizes: x-short, short, and long. The sizes cannot be mixed between upper and lower links (i.e. Long upper link can only be used with long lower link. Each link has a slotted version as well.
- Links are sold individually, unless you require an entire set of 8 (4 front, 4 rear). See drawings for additional clarification on link type (i.e. long, short, or extra-short), and the appropriate part numbers for ordering.
- Note: Short links are DMF's default configuration for our Railgear.

Cylinders / Brakes (also see drawing on next page):

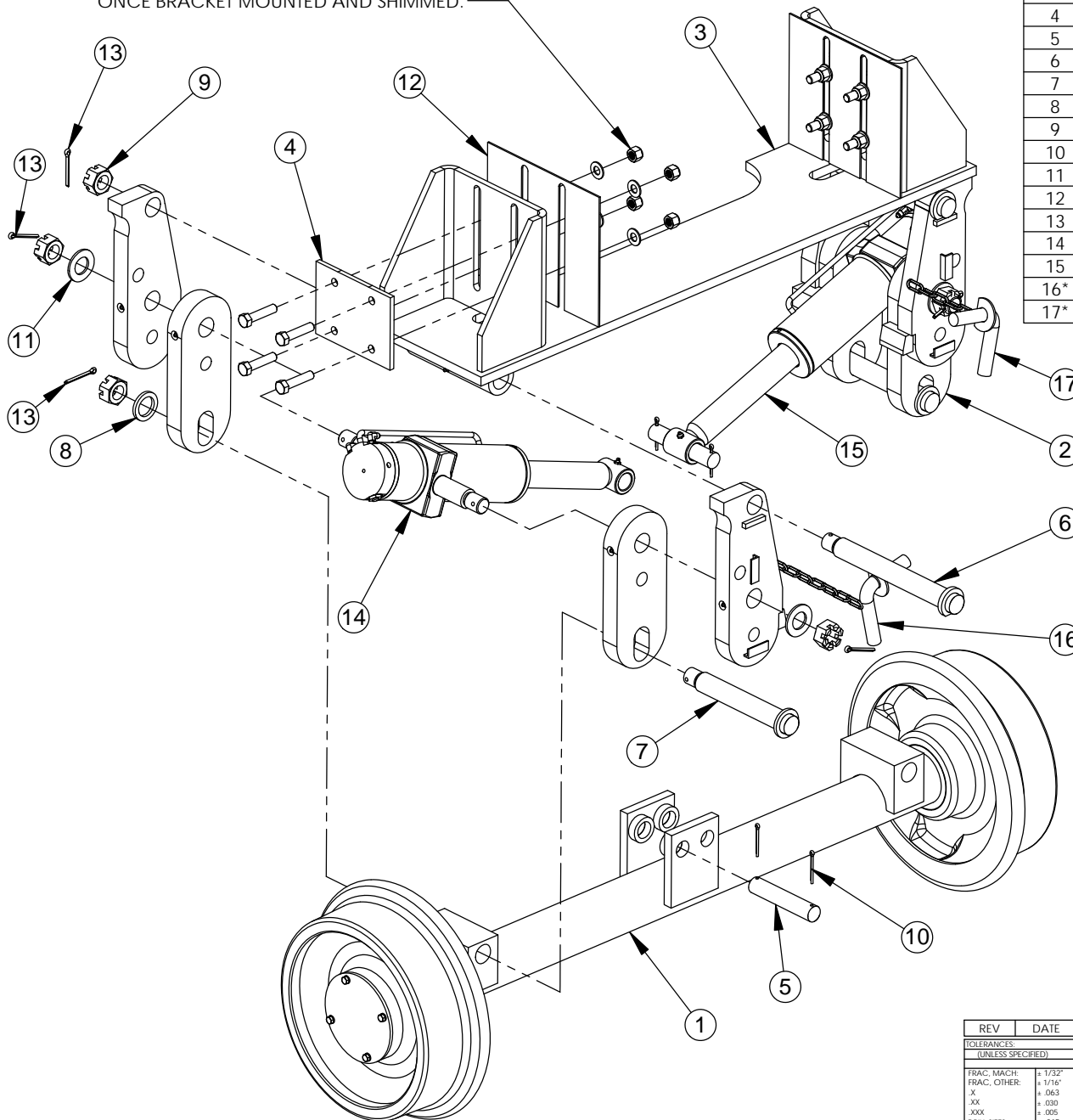
- When ordering rear cylinders, it is important to note which way the pin-offs are facing – if they are facing toward the rear of the truck, then this is considered our standard mounting configuration, then “driver’s side” and “passenger’s side” terminology is consistent with the layout of the vehicle. HOWEVER, if the pin-offs are facing toward the front of the truck (i.e. underneath the truck), which is usually done to accommodate clearance issues when installing air remote pin-offs, terminology is reversed. In that case, the “driver’s side” cylinder is actually on the passenger’s side of the vehicle, and should be ordered as the driver’s side. The reverse applies for the other side of the vehicle. If you are unsure or have questions, please speak to an DMF parts representative for clarification.
- Note that there are two sizes of rear cylinders: Standard and Extra Short. The only difference between these two cylinders is their barrel length, so please confirm the length of your cylinder and select the appropriate drawing for part numbers.

Rear Mounting Bracket:

- It is important to know your rear frame width first and then refer to the Rear Frame Drawing and use the provided chart to find your part number.
- It is also important to note the thickness of the rear mounting bracket flat plate, because we offer different thickness.
- Please note the height of your rear mounting bracket side plates, because we offer different heights.
- Shims are available to adapt wider brackets to different frame widths. If your exact measurements are not available on the parts list, please discuss this with the DMF Parts department and we will work with you to get the appropriate rear bracket and necessary shims.

5/8-11 HEX BOLTS, 5/8-11 NYLOCK NUTS, & 5/8" FLAT WASHERS  
NOT PROVIDED. FASTEN TO 154 LB-FT.

MUST BE GRADE 5 FOR REAR ONLY. LENGTH TO BE DETERMINED  
ONCE BRACKET MOUNTED AND SHIMMED.



ITEM	PART NUMBER	QTY	DESCRIPTION
1		1	WHEEL & AXLE ASSY., REAR (RW-1630)
2			REAR LINK ASSY., SHORT, SLOTTED
3			REAR MOUNTING BRACKET
4	818221	2	REAR MOUNTING BRACKET PLATE
5	818240	2	CYLINDER ROD PIN
6	818250	2	UPPER PIN ASSY.
7	818257	2	LOWER PIN ASSY. W/HEAD FOR SLOTTED LINKS
8	818255	2	SLOTTED LINK PIN HEAD
9	818256	8	NUT, SLOTTED HEX (1-1/4"-7)
10	818248	4	COTTER PIN, 3/16" X 2"
11	818289	4	FLAT WASHER, 1-1/4"
12	818194	1	REAR BRACKET SHIMS PACKAGE
13	818258	8	COTTER PIN, 1/4" X 2-1/2"
14		1	HYDRAULIC CYLINDER ASSY., DRIVER SIDE
15		1	HYDRAULIC CYLINDER ASSY., PASSENGER SIDE
16*			PIN-OFF ASSY., REAR DRIVER SIDE
17*			PIN-OFF ASSY., REAR PASSENGER SIDE

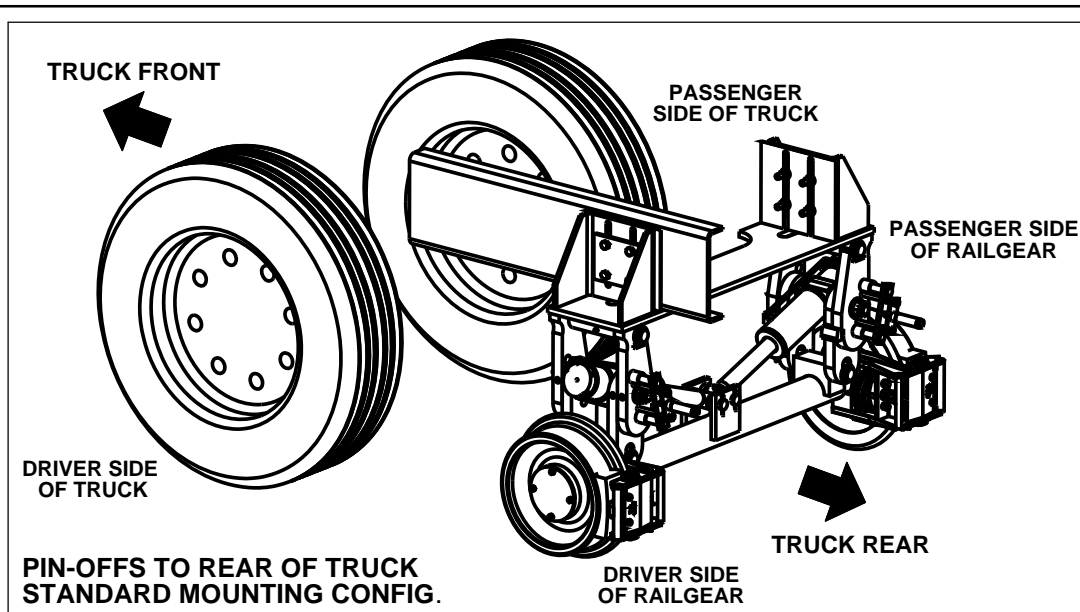
\*ITEM #'S 16 & 17 ARE COMPONENTS OF ITEM # 2

**REAR PIN KITS:**  
STANDARD LINKS - 818800  
SLOTTED LINKS - 818801

DRAWING IS FOR ILLUSTRATIVE PURPOSES. YOUR  
PARTS MAY NOT BE EXACTLY AS PICTURED.

REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED)				
FRAC. MACH: ± 1/32"				
FRAC. OTHER: ± 1/16"				
.X ± .063				
.XX ± .030				
.XXX ± .005				
DRILL SIZES: ± .015				
ANGULAR: ± 1°				
SURF FINISH: 125 MICRO				
THREADS: 2A AND 2B				
RW-1630				
TITLE: RW-1630 REAR RAILGEAR ASSY., NON-INSULATED, MANUAL PIN-OFFS				
DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512				
DRAWN BY:	APPD BY:	DATE:	DRAWING NUMBER:	REV:
JDI	-	8/6/14	M1630141	#



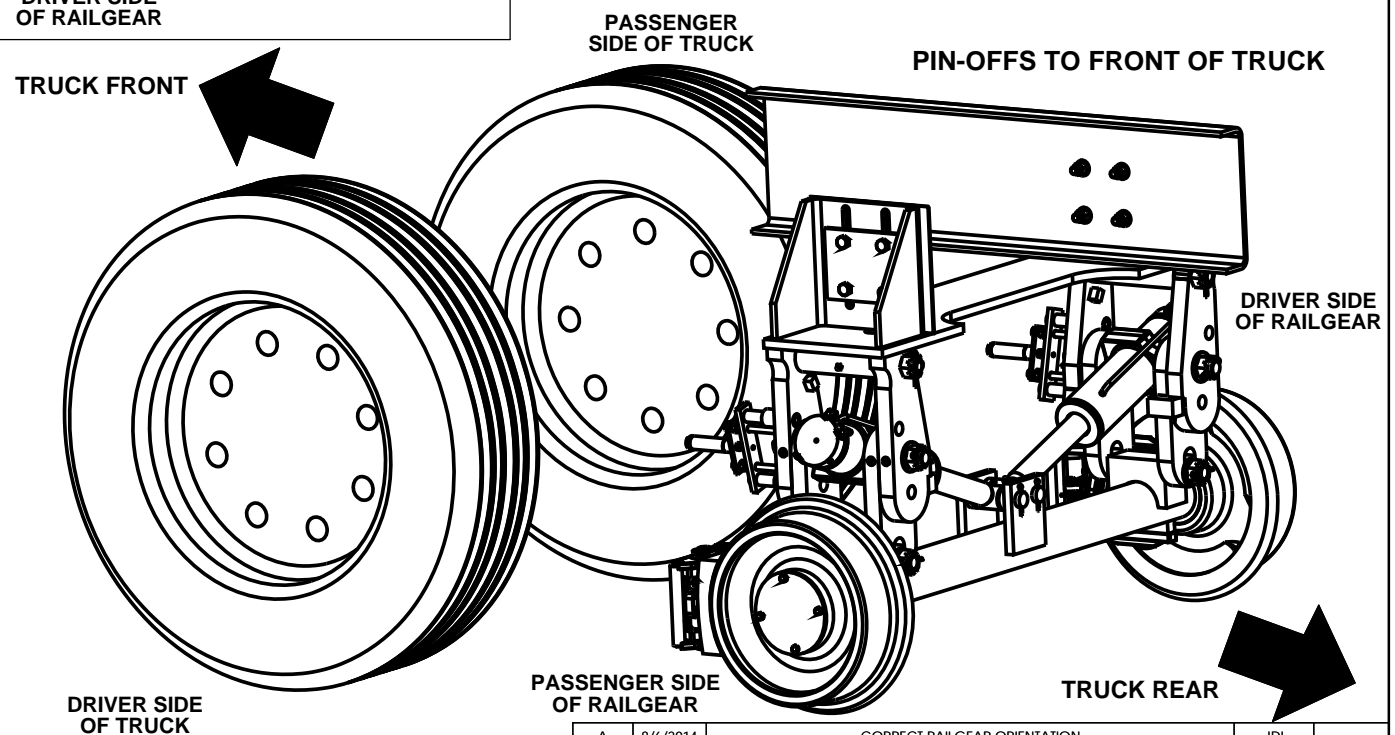



# **BEFORE ORDERING REAR CYLINDERS, LINKS, AND/OR BRAKES ONLY:**

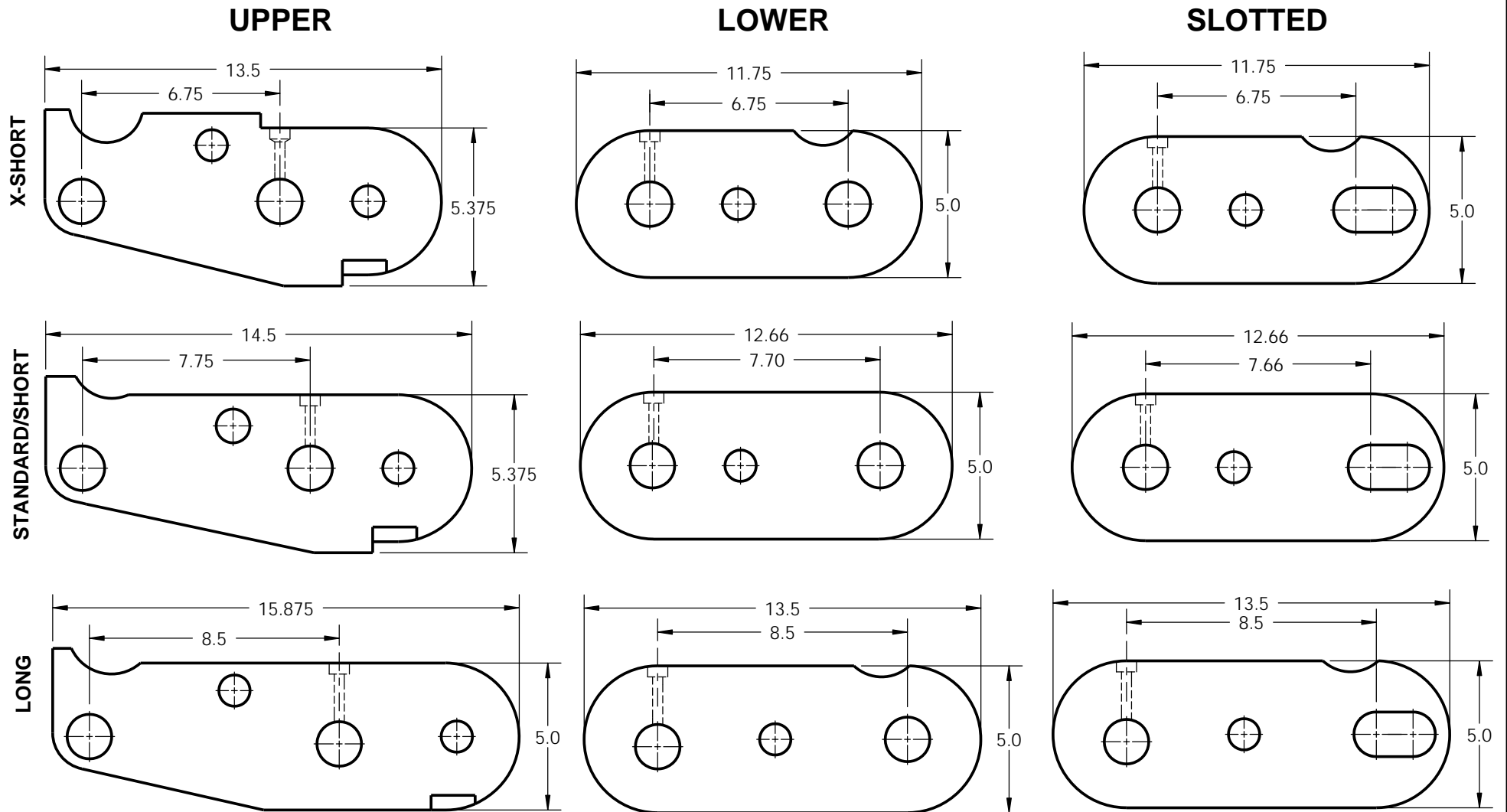
WHEN ORDERING REAR PARTS, IT IS IMPORTANT TO NOTE WHICH WAY THE PIN-OFFS ARE FACING - IF THEY ARE FACING TOWARD THE REAR OF THE TRUCK, THEN THIS IS CONSIDERED OUR STANDARD MOUNTING CONFIGURATION. THEN "DRIVER'S SIDE" & "PASSENGER'S SIDE" TERMINOLOGY IS CONSISTENT WITH THE LAYOUT OF THE VEHICLE. **HOWEVER**, IF THE PIN-OFFS ARE FACING TOWARD THE FRONT OF THE TRUCK (IE. UNDERNEATH THE TRUCK), WHICH IS USUALLY DONE TO ACCOMMODATE THE CLEARANCE ISSUES WHEN INSTALLING AIR REMOTE PIN-OFFS, (IE. THE "DRIVER'S SIDE" CYLINDER IS ACTUALLY ON THE PASSENGER'S SIDE OF THE VEHICLE, & SHOULD BE ORDERED AS THE DRIVER'S SIDE. THE REVERSE APPLIES FOR THE OTHER SIDE OF THE VEHICLE).

\* NOTE: ALL OTHER REAR PARTS ARE NOT (DS) DRIVER SIDE OR (PS) PASSENGER SIDE SPECIFIC.

\*PLEASE NOTE THAT IF YOU HAVE INSULATED RAILGEAR & YOU MOUNT THE GEAR BACKWARDS, YOU MUST SWAP THE WHEELS. INSULATED WHEEL SHOULD ALWAYS BE ON THE ACTUAL DRIVER'S SIDE OF THE TRUCK.



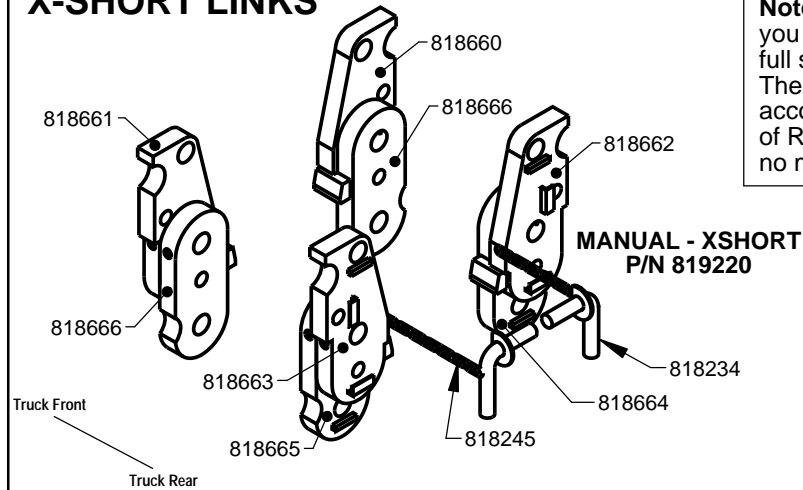
A		8/6/2014		CORRECT RAILGEAR ORIENTATION				JDI			
REV		DATE		DESCRIPTION				BY		APP	
TOLERANCES:				TITLE:  PIN-OFFS TO FRONT/REAR OF TRUCK							
(UNLESS SPECIFIED)											
FRAC. MACH: ± 1/32"				DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512							
FRAC. OTHER: ± 1/16"											
.XX ± .063				DATE:							
.XXX ± .030											
.XXX ± .005				DRAWING NUMBER:							
DRILL SIZES: ± .015											
ANGULAR: ± 1°				REV:							
SURF FINISH: 125 MICRO											
THREADS: 2A AND 2B				DRAWN BY: JBG							
SEE AN ISHOP CODED COPY OF TAPPI											
APPD BY:				8/10/2010							
											
				M1630110							
				A							



**NOTE:** DMF LINKS COME IN 3 SIZES: X-SHORT, STD./SHORT, & LONG.  
 THE SIZES CAN NOT BE MIXED BETWEEN UPPER & LOWER LINKS.  
 EXAMPLE: LONG UPPER LINK CAN ONLY BE USED WITH LONG LOWER LINK. EACH LINK HAS A SLOTTED VERSION.

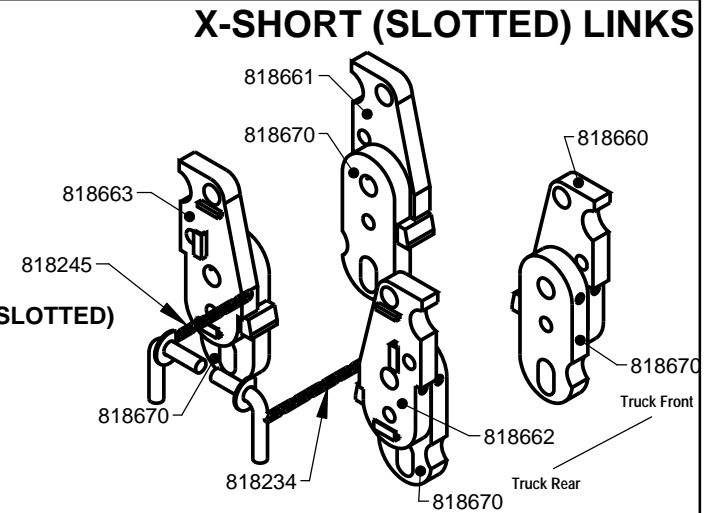
<div> <div></div> <div></div> </div>					
REV	DATE	DESCRIPTION			APP
TOLERANCES: (UNLESS SPECIFIED) FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B		RW-1630/50		TITLE: RW-1630/50 REAR LINK OPTIONS & DIMENSIONS DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512	
DRAWN BY:	APPD BY:	DATE:		DRAWING NUMBER:	REV:
JBG		9/18/09		M1630111	#

## X-SHORT LINKS

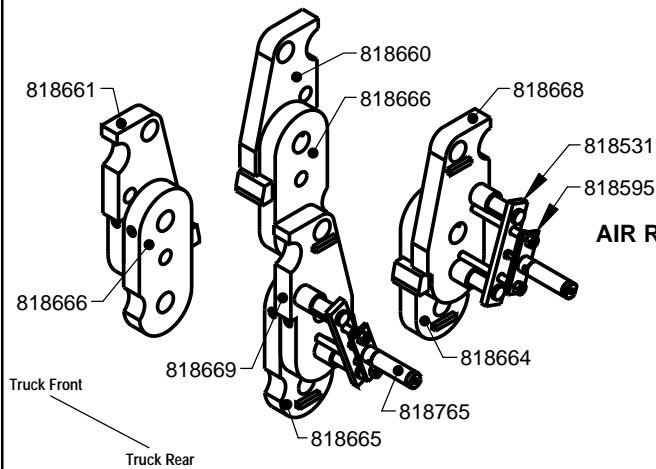


**Note:** Links are sold individually unless you want a full set of all 8. Please refer to full set p/n's shown below.  
The "Rear Set of Rear Links" differ in p/n's according to pin-off option. Your "Front Set of Rear Links" are the same, for x-short links, no matter what pin-off option you have.

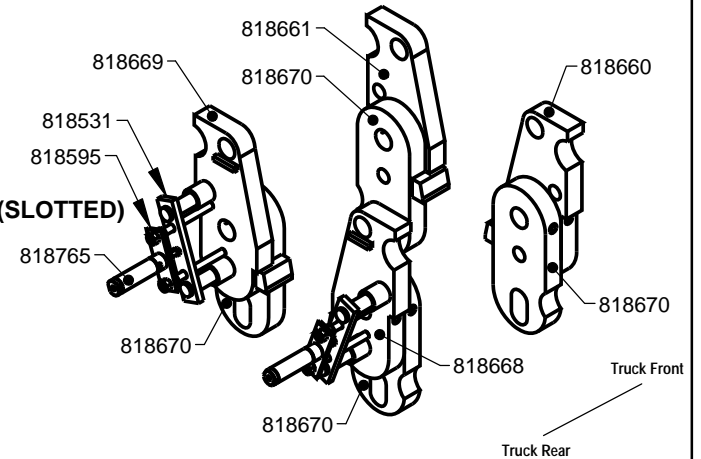
**MANUAL - XSHORT (SLOTTED) P/N 819222**



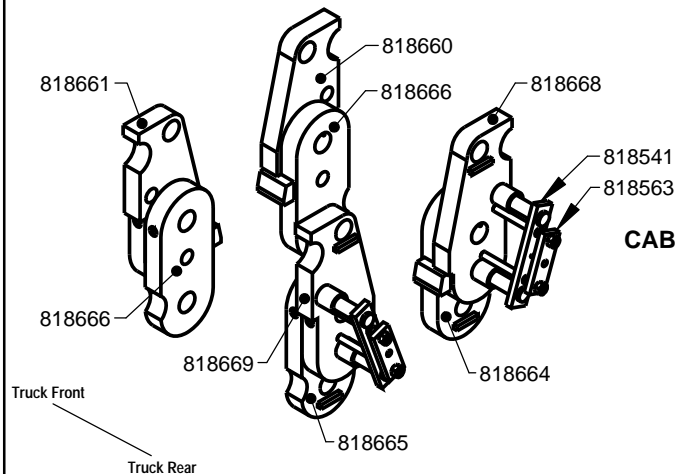
**AIR REMOTE - XSHORT P/N 819224**



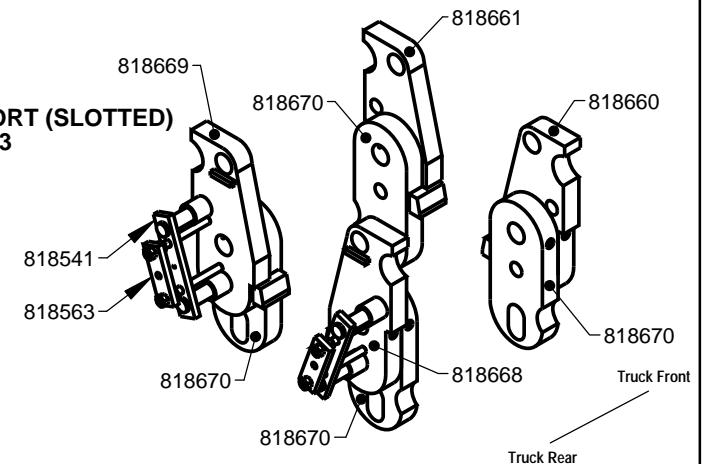
**AIR REMOTE - XSHORT (SLOTTED) P/N 819225**



**CABLE REMOTE - XSHORT P/N 819221**



**CABLE REMOTE - XSHORT (SLOTTED) P/N 819223**



TITLE:

X-SHORT (STANDARD & SLOTTED LINKS)

DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512

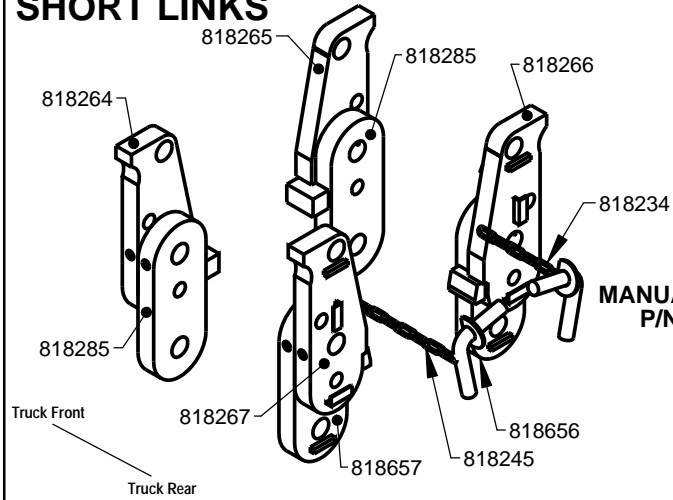
DATE:  
7/26/2010



DRAWING NUMBER:  
M1630107

REV:  
#

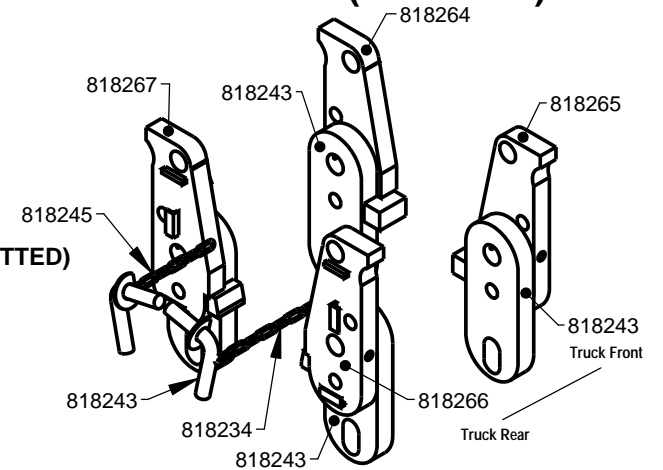
## SHORT LINKS



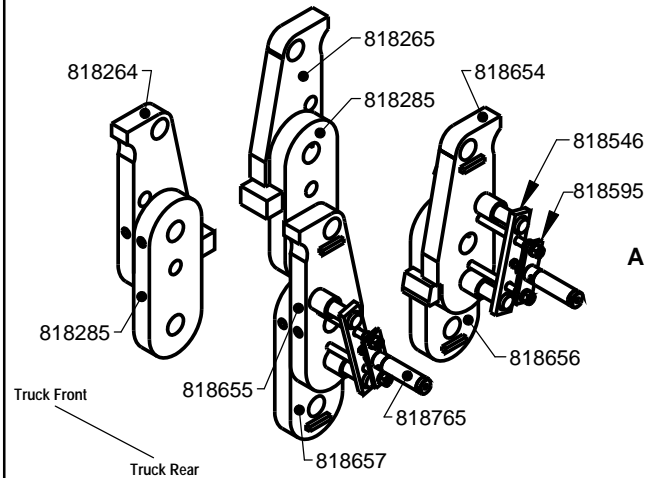
**MANUAL - SHORT  
P/N 819200**

**Note:** Links are sold individually unless you want a full set of all 8. Please refer to full set p/n's shown below.  
The "Rear Set of Rear Links" differ in p/n's according to pin-off option. Your "Front Set of Rear Links" are the same, for short links, no matter what pin-off option you have.

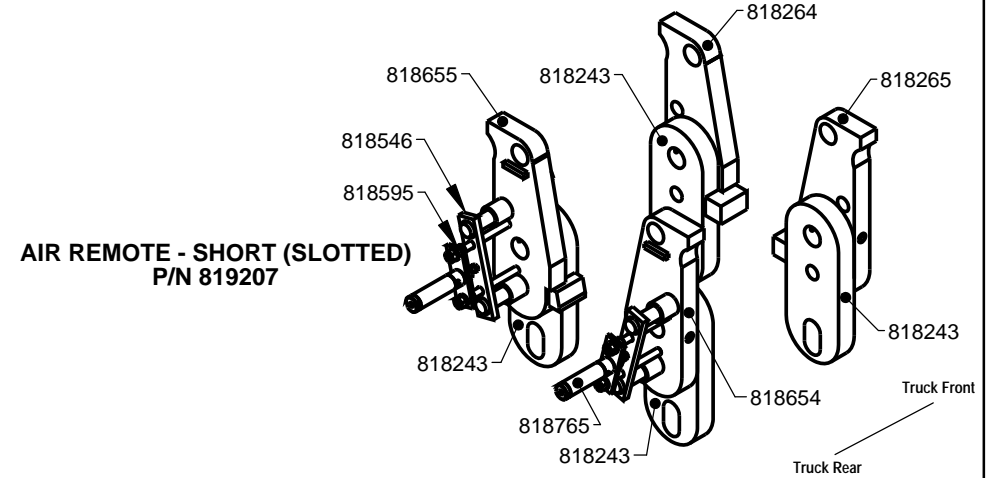
## SHORT (SLOTTED) LINKS



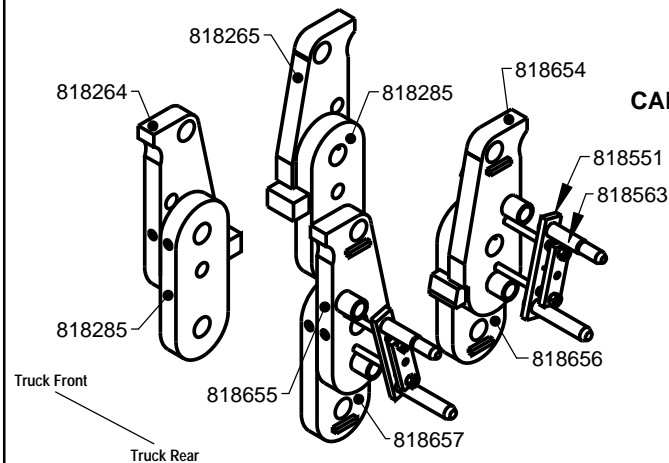
**MANUAL - SHORT (SLOTTED)  
P/N 819202**



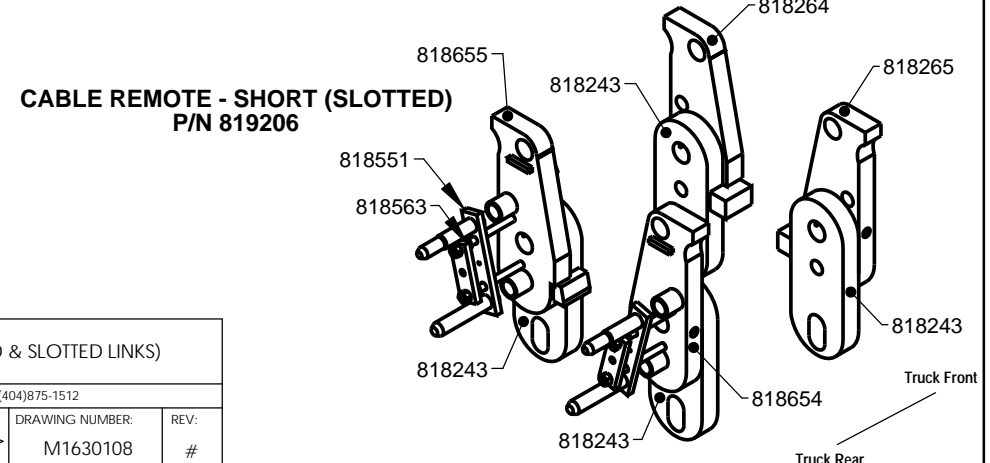
**AIR REMOTE - SHORT  
P/N 819205**



**AIR REMOTE - SHORT (SLOTTED)  
P/N 819207**



**CABLE REMOTE - SHORT  
P/N 819204**



**CABLE REMOTE - SHORT (SLOTTED)  
P/N 819206**

TITLE:

SHORT (STANDARD & SLOTTED LINKS)

DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512

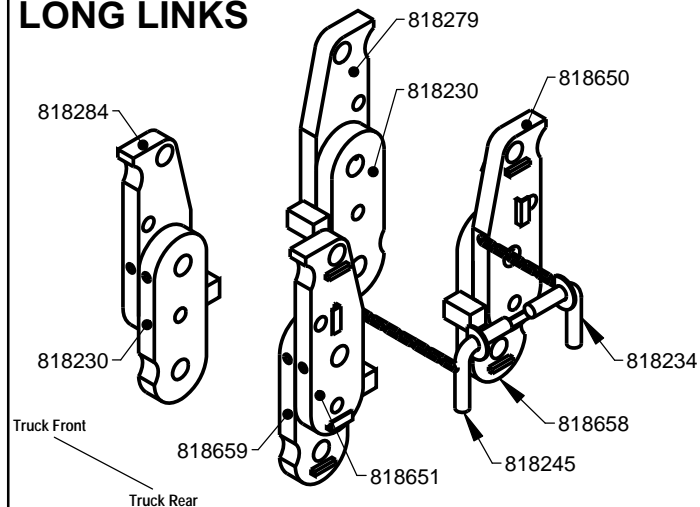
DATE:  
7/26/2010



DRAWING NUMBER:  
M1630108

REV:  
#

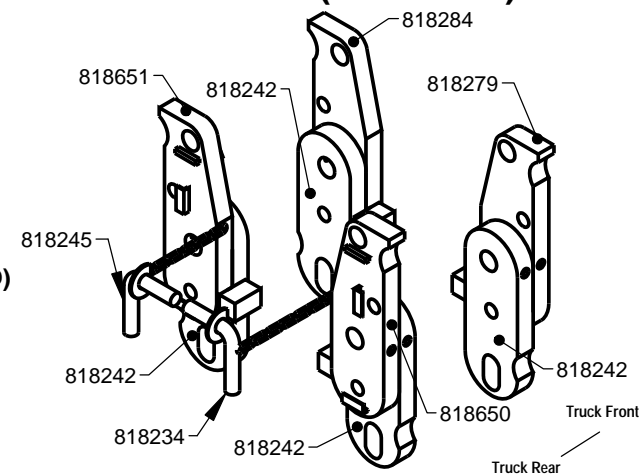
## LONG LINKS



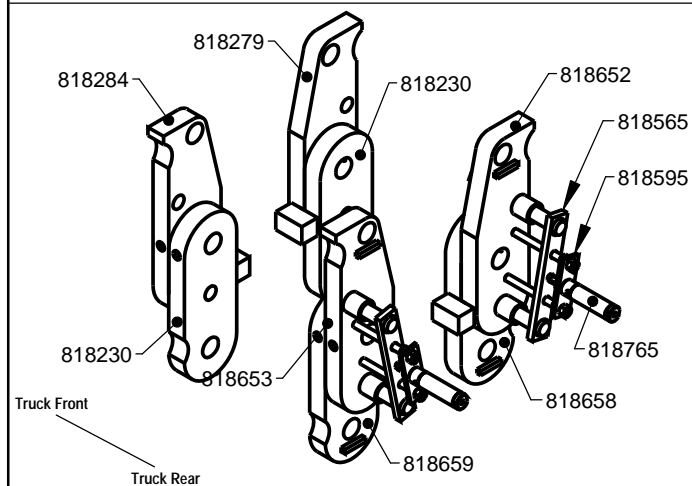
**MANUAL - LONG**  
P/N 819208

**Note:** Links are sold individually unless you want a full set of all 8. Please refer to full set p/n's shown below.  
The "Rear Set of Rear Links" differ in p/n's according to pin-off option. Your "Front Set of Rear Links" are the same, for long links, no matter what pin-off option you have.

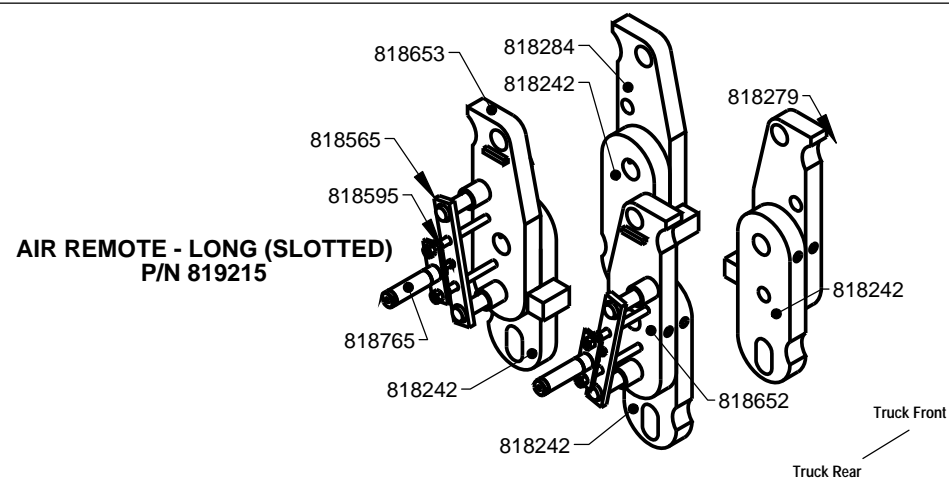
## LONG (SLOTTED) LINKS



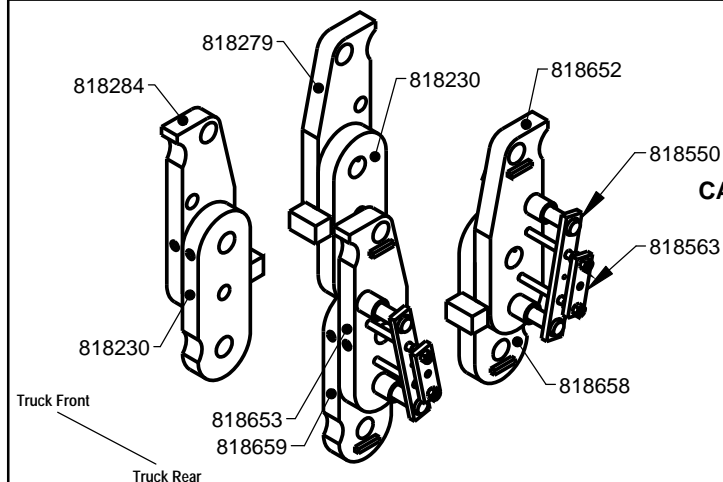
**MANUAL - LONG (SLOTTED)**  
P/N 819210



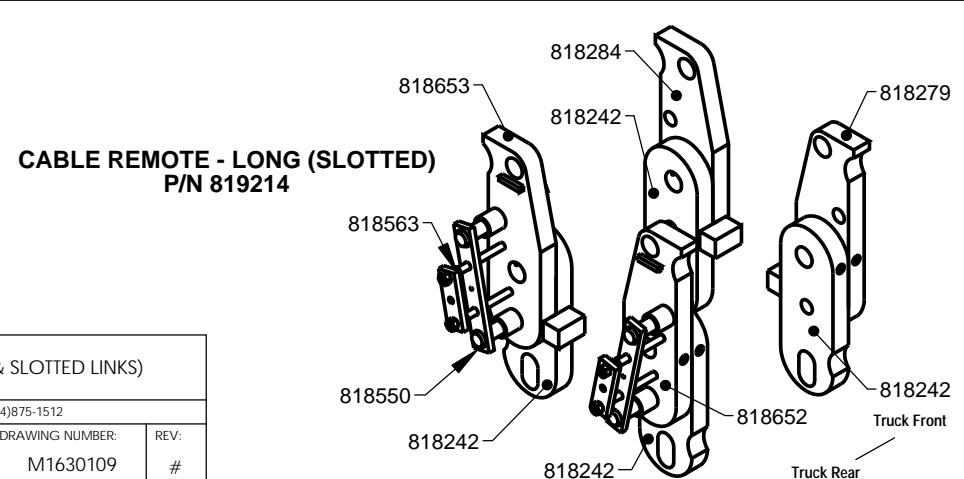
**AIR REMOTE - LONG**  
P/N 819213



**AIR REMOTE - LONG (SLOTTED)**  
P/N 819215



**CABLE REMOTE - LONG**  
P/N 819212



**CABLE REMOTE - LONG (SLOTTED)**  
P/N 819214

TITLE:

LONG (STANDARD & SLOTTED LINKS)

DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512

DATE:

7/26/2010



DRAWING NUMBER:

M1630109

REV:

#

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	—	1	1630 REAR AXLE WELDMENT TUBE W/ BRAKES
2	800102	2	RW-1630 SEAL STANDARD (CR-39934)
3	800100	4	RW-1630 BEARING CONE (TIMKEN-567)
4	WHEEL	2	1630 WHL ASSY, NON-INS W/ RACES
5	800105	2	RW-1630 NUT, INNER WHEEL (EUCLID E-540)
6	800107	2	RW-1630 WASHER, AXLE LOCK (EUCLID E-573)
7	800104	2	RW-1630 WASHER, AXLE TAB (EUCLID E-2237)
8	800106	2	RW-1630 NUT, OUTER WHEEL (EUCLID E-572)
9	818104	2	RW-1630 HUBCAP DETAIL (7" DIA.)
10	800109	8	5/16" LOCK WASHER (LWS/16)
11	800108	8	HEX HD SCREW 5/16-18 x 3/4" LONG
12	800101	2	BEARING RACE (TIMKEN 563 — COMPONENT OF P/N 820220)
13	818101	1	RW-1630 AXLE STANDARD (3-1/4" X 61-29/32")

- Wheel Bearing Grease:**
- Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
  - Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)

**NOTE: DRAWING & PART NUMBERS ARE APPLICABLE FOR BOTH 1630 AND UNDER-CAB REAR.**

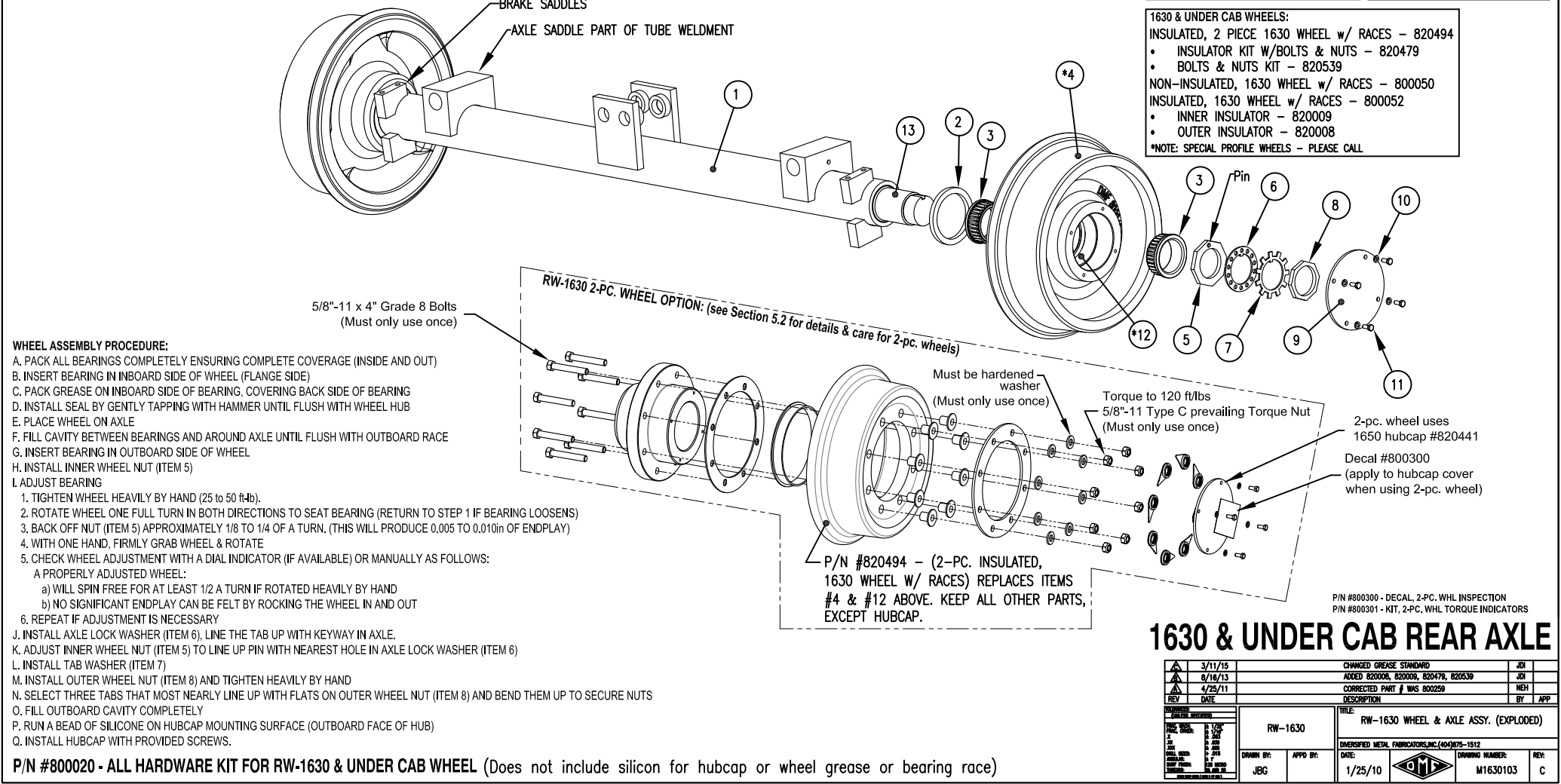
**PARTS: (Must have serial # when ordering)**

**COMPLETE REAR AXLE ASSEMBLY OPTIONS (AXLE, AXLE TUBE, WHEELS):**  
 INSULATED, NO BRAKES (1630 & UNDER CAB) — 800204  
 INSULATED, WITH BRAKES (1630 & UNDER CAB) — 800208  
 NON-INSULATED, NO BRAKES (1630 & UNDER CAB) — 800202  
 NON-INSULATED, WITH BRAKES (1630 & UNDER CAB) — 800206  
 2-PC. INSULATED, NO BRAKES (1630 & UNDER CAB) — 800238▲  
 2-PC. INSULATED, WITH BRAKES (1630 & UNDER CAB) — 800260

**1630 & UNDER CAB AXLE TUBES:**  
 AXLE TUBE, NO BRAKES — 818308  
 AXLE TUBE, WITH BRAKES — 818200

**1630 & UNDER CAB BEARING RACE:**  
 TIMKEN 563 BEARING RACE — 800101

**1630 & UNDER CAB WHEELS:**  
 INSULATED, 2 PIECE 1630 WHEEL w/ RACES — 820494  
 • INSULATOR KIT W/BOLTS & NUTS — 820479  
 • BOLTS & NUTS KIT — 820539  
 NON-INSULATED, 1630 WHEEL w/ RACES — 800050  
 INSULATED, 1630 WHEEL w/ RACES — 800052  
 • INNER INSULATOR — 820009  
 • OUTER INSULATOR — 820008  
 \*NOTE: SPECIAL PROFILE WHEELS — PLEASE CALL



- WHEEL ASSEMBLY PROCEDURE:**
- PACK ALL BEARINGS COMPLETELY ENSURING COMPLETE COVERAGE (INSIDE AND OUT)
  - INSERT BEARING IN INBOARD SIDE OF WHEEL (FLANGE SIDE)
  - PACK GREASE ON INBOARD SIDE OF BEARING, COVERING BACK SIDE OF BEARING
  - INSTALL SEAL BY GENTLY TAPPING WITH HAMMER UNTIL FLUSH WITH WHEEL HUB
  - PLACE WHEEL ON AXLE
  - FILL CAVITY BETWEEN BEARINGS AND AROUND AXLE UNTIL FLUSH WITH OUTBOARD RACE
  - INSERT BEARING IN OUTBOARD SIDE OF WHEEL
  - INSTALL INNER WHEEL NUT (ITEM 5)
  - ADJUST BEARING
    - TIGHTEN WHEEL HEAVILY BY HAND (25 to 50 ft·lb).
    - ROTATE WHEEL ONE FULL TURN IN BOTH DIRECTIONS TO SEAT BEARING (RETURN TO STEP 1 IF BEARING LOOSENS)
    - BACK OFF NUT (ITEM 5) APPROXIMATELY 1/8 TO 1/4 OF A TURN. (THIS WILL PRODUCE 0.005 TO 0.010in OF ENDPLAY)
    - WITH ONE HAND, FIRMLY GRAB WHEEL & ROTATE
    - CHECK WHEEL ADJUSTMENT WITH A DIAL INDICATOR (IF AVAILABLE) OR MANUALLY AS FOLLOWS:  
 A PROPERLY ADJUSTED WHEEL:  
 a) WILL SPIN FREE FOR AT LEAST 1/2 A TURN IF ROTATED HEAVILY BY HAND  
 b) NO SIGNIFICANT ENDPLAY CAN BE FELT BY ROCKING THE WHEEL IN AND OUT
    - REPEAT IF ADJUSTMENT IS NECESSARY
  - INSTALL AXLE LOCK WASHER (ITEM 6), LINE THE TAB UP WITH KEYWAY IN AXLE.
  - ADJUST INNER WHEEL NUT (ITEM 5) TO LINE UP PIN WITH NEAREST HOLE IN AXLE LOCK WASHER (ITEM 6)
  - INSTALL TAB WASHER (ITEM 7)
  - INSTALL OUTER WHEEL NUT (ITEM 8) AND TIGHTEN HEAVILY BY HAND
  - SELECT THREE TABS THAT MOST NEARLY LINE UP WITH FLATS ON OUTER WHEEL NUT (ITEM 8) AND BEND THEM UP TO SECURE NUTS
  - FILL OUTBOARD CAVITY COMPLETELY
  - RUN A BEAD OF SILICONE ON HUBCAP MOUNTING SURFACE (OUTBOARD FACE OF HUB)
  - INSTALL HUBCAP WITH PROVIDED SCREWS.

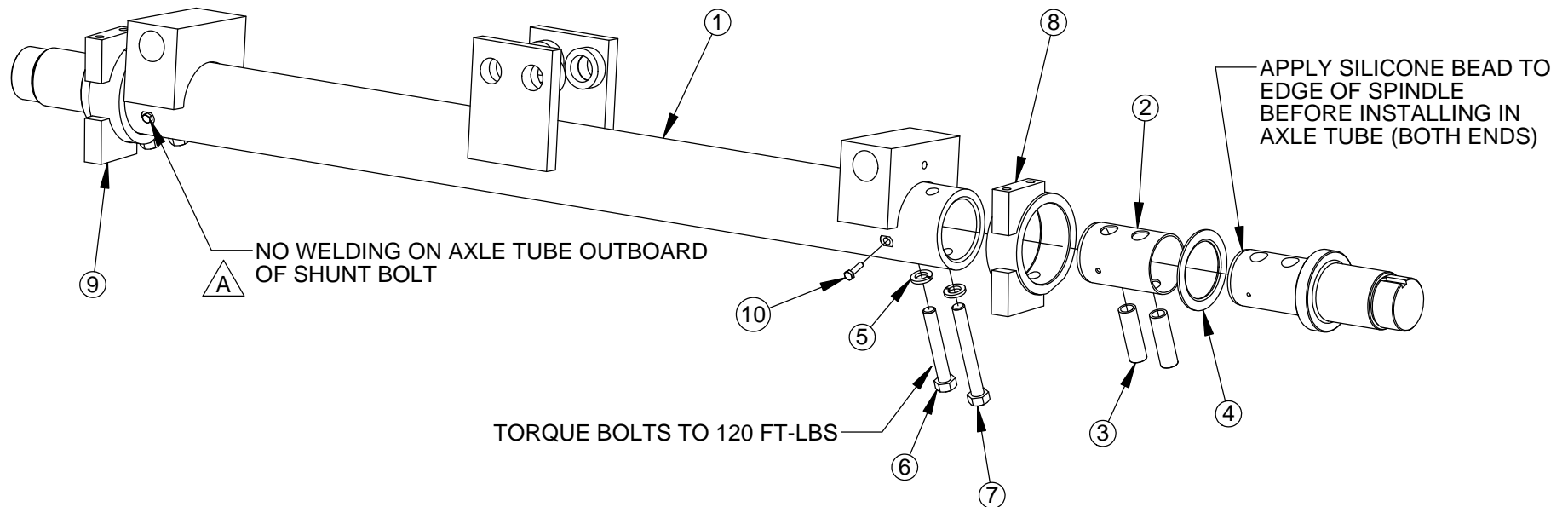
**P/N #800020 - ALL HARDWARE KIT FOR RW-1630 & UNDER CAB WHEEL** (Does not include silicon for hubcap or wheel grease or bearing race)

P/N #800300 - DECAL, 2-PC. WHL INSPECTION  
 P/N #800301 - KIT, 2-PC. WHL TORQUE INDICATORS

# 1630 & UNDER CAB REAR AXLE

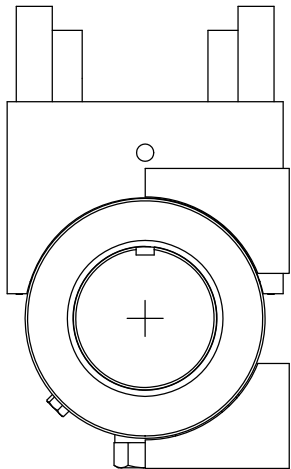
3/11/15	CHANGED GREASE STANDARD	JON
8/16/13	ADDED 820006, 820009, 820479, 820539	JON
4/25/11	CORRECTED PART # WAS 800259	NEH
REV	DATE	DESCRIPTION
1	3/11/15	RW-1630
2	8/16/13	RW-1630
3	4/25/11	RW-1630
4	3/11/15	RW-1630
5	8/16/13	RW-1630
6	4/25/11	RW-1630
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254	8/16/13	RW-1630
255	4/25/11	RW-1630
256	3/11/15	RW-1630
257	8/16/13	RW-1630
258	4/25/11	RW-1630
259	3/11/15	RW-1630

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	820700	1	AXLE TUBE WELDMENT, 1630, REAR, STUB AXLE, STANDARD GAUGE
2	820603	2	INSULATOR TUBE, 1630 STUB AXLE
3	820604	4	BOLT INSULATOR, 1630 STUB AXLE
4	820602	2	INSULATOR DISC, 1630 STUB AXLE
5	108268	4	5/8" LOCKWASHER, GRADE 8
6	820486	2	HHCS 5/8-11 UNC x 4", GRADE 8
7	605120	2	HHCS 5/8-11 UNC X 5", GRADE 8
8	820701	1	BRAKE SADDLE WELDMENT, REAR PASSENGER SIDE, 1630 STUB AXLE
9	820702	1	BRAKE SADDLE WELDMENT, REAR DRIVER SIDE, 1630 STUB AXLE
10	605139	2	HHCS 1/4-20 UNC X 1", NYLON
11	820601	2	STUB AXLE DETAIL, 1630, INSULATED

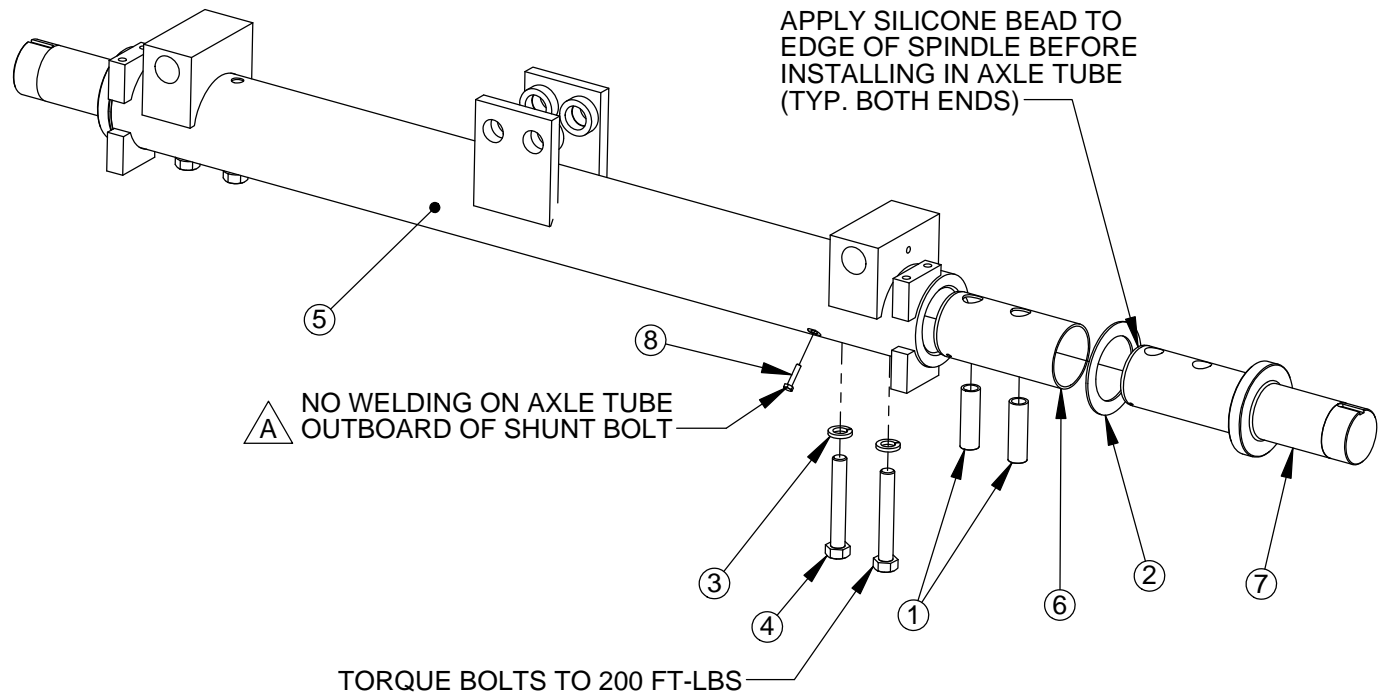


**NOTE:**  
 1. INSTALL ALL INSULATORS ON STUB AXLE BEFORE PRESSING INTO AXLE TUBE  
 2. CHECK FOR ZERO CONTINUITY AFTER ASSEMBLY

<div><div><div><div><div><div></div></div></div><div><div></div></div></div><div><div></div></div></div></div>		-		-		-							
<div><div><div><div><div><div></div></div></div><div><div></div></div></div><div><div></div></div></div></div>		6/4/2014		ADDED NOTE				JDI					
REV		DATE		DESCRIPTION				BY APP					
TOLERANCES: (UNLESS SPECIFIED)				TITLE:  AXLE ASSEMBLY, 1630 REAR, STUB AXLE, DBL INSULATED  DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512									
FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" X ± .063 XX ± .030 XXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1" SURF FINISH: 125 MICRO THREADS: 2A AND 2B													
RW-1630		DRAWN BY: BJJ		APPD BY:		DATE: 9/20/12		<div><div><div><div><div></div></div></div><div><div></div></div></div><div><div></div></div></div>		DRAWING NUMBER: 820703		REV: A	
REAL SHARP TOOLS (302) 437-1061													






ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	820458	4	BOLT INSULATOR, 1650 STUB AXLE
2	820461	2	INSULATOR DISC, 1650 STUB AXLE
3	820462	4	LOCK WASHER, 3/4", GRADE 8
4	820463	4	HEX HEAD CAP SCREW, 3/4-10 UNC x 5" LONG, GRADE 8
5	820541	1	AXLE TUBE WELDMENT - 1650 STUB AXLE, GEN 2
6	820547	2	INSULATOR TUBE, 1650 STUB AXLE, GEN 2
7	820543	2	STUB AXLE DETAIL - INSULATED 1650 GEN 2
8	605302	2	HHCS 1/4-20 X 1-1/4", NYLON



#### NOTES:

1. INSTALL ALL INSULATORS ON STUB AXLE BEFORE PRESSING INTO AXLE TUBE

	-	-			-		
	6/4/2014	ADDED NOTE			JDI		
REV	DATE	DESCRIPTION			BY	APP	
TOLERANCES: (UNLESS SPECIFIED)		RW-1650	TITLE:  AXLE TUBE ASSEMBLY, INSULATED BOTH ENDS- 1650 STUB AXLE, GEN 2				
FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" XX ± .063 XX ± .030 XXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B			DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512				
DRAWN BY:			APPD BY:	DATE:		DRAWING NUMBER:	REV:
JDI				9/19/13		820549	A

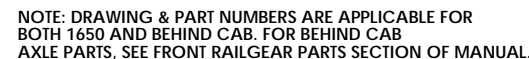


**COMPLETE REAR AXLE ASSEMBLY OPTIONS (AXLE, AXLE TUBE, WHEELS):**  
 NON-INSULATED, WITH BRAKES (1650) - 800213  
 NON-INSULATED, NO BRAKES (1650) - 800214  
 INSULATED, NO BRAKES (1650) - 800216  
 INSULATED, WITH BRAKES (1650) - 800227  
 2-PC. WHEEL, NO BRAKES (1650) - 800218  
 2-PC. WHEEL, WITH BRAKES (1650) - 800261

**1650 & BEHIND CAB WHEELS:**  
 NON-INSULATED, 1650 WHEEL W/ RACES - 800015  
 INSULATED, 1650 WHEEL W/ RACES - 800016  
 • INNER INSULATOR - 820020  
 • OUTER INSULATOR - 820018  
 INSULATED, 2 PIECE 1650 WHEEL W/ RACES - 820496  
 • INSULATOR KIT W/ BOLTS & NUTS - 820479  
 • BOLTS & NUT KIT - 820539  
 \* NOTE: SPECIAL PROFILE WHEELS - PLEASE CALL

**1650 & BEHIND CAB BEARING RACE:**  
TIMKEN 6420 BEARING RACE - 800125

- **Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
- **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)

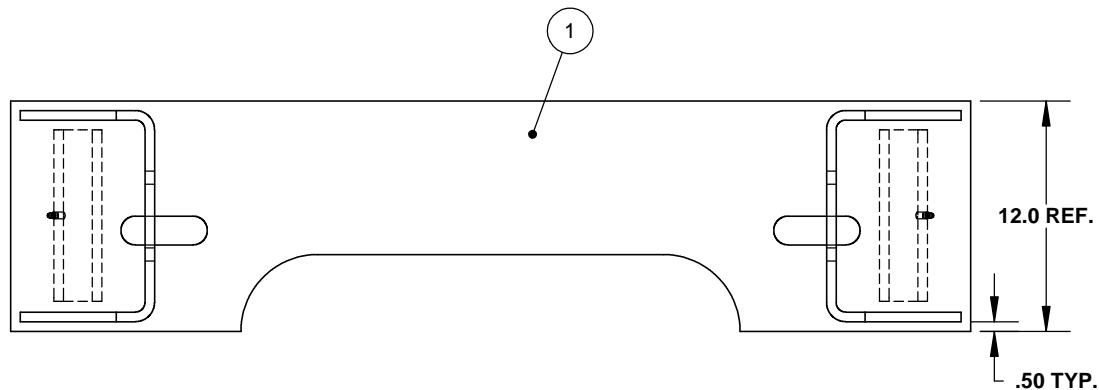


D	3/11/15	CHANGED GEAR STANDARD		JDI
C	8/16/13	ADDED \$20018, \$20020, \$20479, \$20539		JDI
B	3/21/13	RE-DRAWN, \$18209 WAS \$18203		JDI
A	4/13/12	\$8002 WE WAS \$8002 AS		JDI
	REV.	DATE	DIS-SECTION	BY APPR
<b>CONTENTS:</b>				TITLE:
<b>ITEMS SPECIFIED:</b> ITEM NO.      QTY 18AC, OTHER    5 18A                 5 18B                 5 18C                 5 18D                 5 18E                 5 18F                 5 18G                 5 18H                 5 18I                 5 18J                 5 18K                 5 18L                 5 18M                 5 18N                 5 18O                 5 18P                 5 18Q                 5 18R                 5 18S                 5 18T                 5 18U                 5 18V                 5 18W                 5 18X                 5 18Y                 5 18Z                 5 18AA               5 18AB               5 18AC               5 18AD               5 18AE               5 18AF               5 18AG               5 18AH               5 18AI               5 18AJ               5 18AK               5 18AL               5 18AM               5 18AN               5 18AO               5 18AP               5 18AQ               5 18AR               5 18AS               5 18AT               5 18AU               5 18AV               5 18AW               5 18AX               5 18AY               5 18AZ               5 18BA               5 18BB               5 18BC               5 18BD               5 18BE               5 18BF               5 18BG               5 18BH               5 18BI               5 18BJ               5 18BK               5 18BL               5 18BM               5 18BN               5 18BO               5 18BP               5 18BQ               5 18BR               5 18BS               5 18BT               5 18BU               5 18BV               5 18BW               5 18BX               5 18BY               5 18BZ               5 18CA               5 18CB               5 18CC               5 18CD               5 18CE               5 18CF               5 18CG               5 18CH               5 18CI               5 18CJ               5 18CK               5 18CL               5 18CM               5 18CN               5 18CO               5 18CP               5 18CQ               5 18CR               5 18CS               5 18CT               5 18CU               5 18CV               5 18CW               5 18CX               5 18CY               5 18CZ               5 18DA               5 18DB               5 18DC               5 18DD               5 18DE               5 18DF               5 18DG               5 18DH               5 18DI               5 18DJ               5 18DK               5 18DL               5 18DM               5 18DN               5 18DO               5 18DP               5 18DQ               5 18DR               5 18DS               5 18DT               5 18DU               5 18DV               5 18DW               5 18DX               5 18DY               5 18DZ               5 18EA               5 18EB               5 18EC               5 18ED               5 18EE               5 18EF               5 18EG               5 18EH               5 18EI               5 18EJ               5 18EK               5 18EL               5 18EM               5 18EN               5 18EO               5 18EP               5 18EQ               5 18ER               5 18ES               5 18ET               5 18EU               5 18EV               5 18EW               5 18EX               5 18EY               5 18EZ               5 18FA               5 18FB               5 18FC               5 18FD               5 18FE               5 18FF               5 18FG               5 18FH               5 18FI               5 18FJ               5 18FK               5 18FL               5 18FM               5 18FN               5 18FO               5 18FP               5 18FQ               5 18FR               5 18FS               5 18FT               5 18FU               5 18FV               5 18FW               5 18FX               5 18FY               5 18FZ               5 18GA               5 18GB               5 18GC               5 18GD               5 18GE               5 18GF               5 18GG               5 18GH               5 18GI               5 18GJ               5 18GK               5 18GL               5 18GM               5 18GN               5 18GO               5 18GP               5 18GQ               5 18GR               5 18GS               5 18GT               5 18GU               5 18GV               5 18GW               5 18GX               5 18GY               5 18GZ               5 18HA               5 18HB               5 18HC               5 18HD               5 18HE               5 18HF               5 18HG               5 18HH               5 18HI               5 18HJ               5 18HK               5 18HL               5 18HM               5 18HN               5 18HO               5 18HP               5 18HQ               5 18HR               5 18HS               5 18HT               5 18HU               5 18HV               5 18HW               5 18HX               5 18HY               5 18HZ               5 18IA               5 18IB               5 18IC               5 18ID               5 18IE               5 18IF               5 18IG               5 18IH               5 18IJ               5 18IK               5 18IL               5 18IM               5 18IN               5 18IO               5 18IP               5 18IQ               5 18IR               5 18IS               5 18IT               5 18IU               5 18IV               5 18IW               5 18IX               5 18IY               5 18IZ               5 18JA               5 18JB               5 18JC               5 18JD               5 18JE               5 18JF               5 18JG               5 18JH               5 18JI               5 18JJ               5 18JK               5 18JL               5 18JM               5 18JN               5 18JO               5 18JP               5 18JQ               5 18JR               5 18JS               5 18JT               5 18JU               5 18JV               5 18JW               5 18JX               5 18JY               5 18JZ               5 18KA				

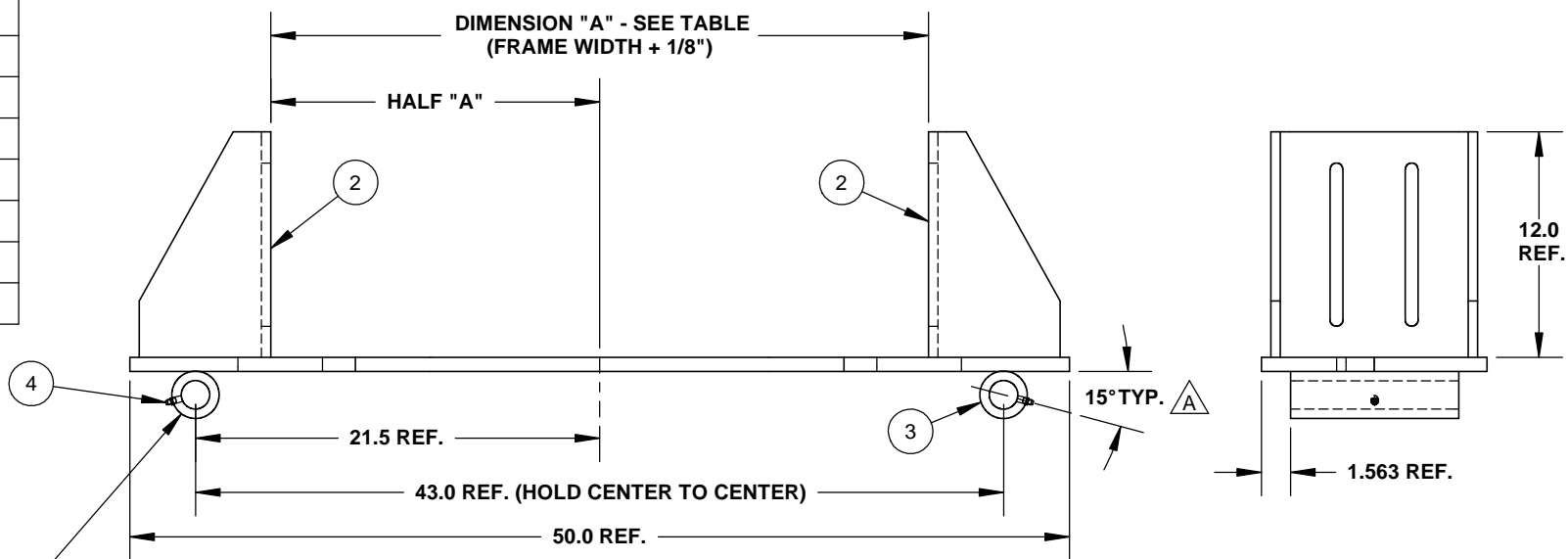
FINISHED PART NO.	"A" DIMENSION
819442	33-1/2"
819444	33-5/8"
819446	33-3/4"
819448	33-7/8"
819450	34"
819501	34-1/8"
819454	34-1/4"
819455	34-5/16"
819456	34-3/8"
819503	34-1/2"
819460	34-5/8"
819462	34-3/4"
819464	34-7/8"
819466	35"
819468	35-1/8"
819469	35-1/4"
819471	35-5/8"
819487	35-3/4"
819484	36"
819491	36-1/2"
819482	43-1/8"



ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	818225	1	REAR BRACKET 3/4" CROSS PLATE
2	818792	2	12" REAR BRACKET GUSSET/SLOTTED PLATE FORMED
3	818228	2	REAR BRACKET CROSS TUBE (2-1/2" X 8-15/16")
4	818235	2	GREASE FITTING FOR REAR LINKS 1/8" NPT

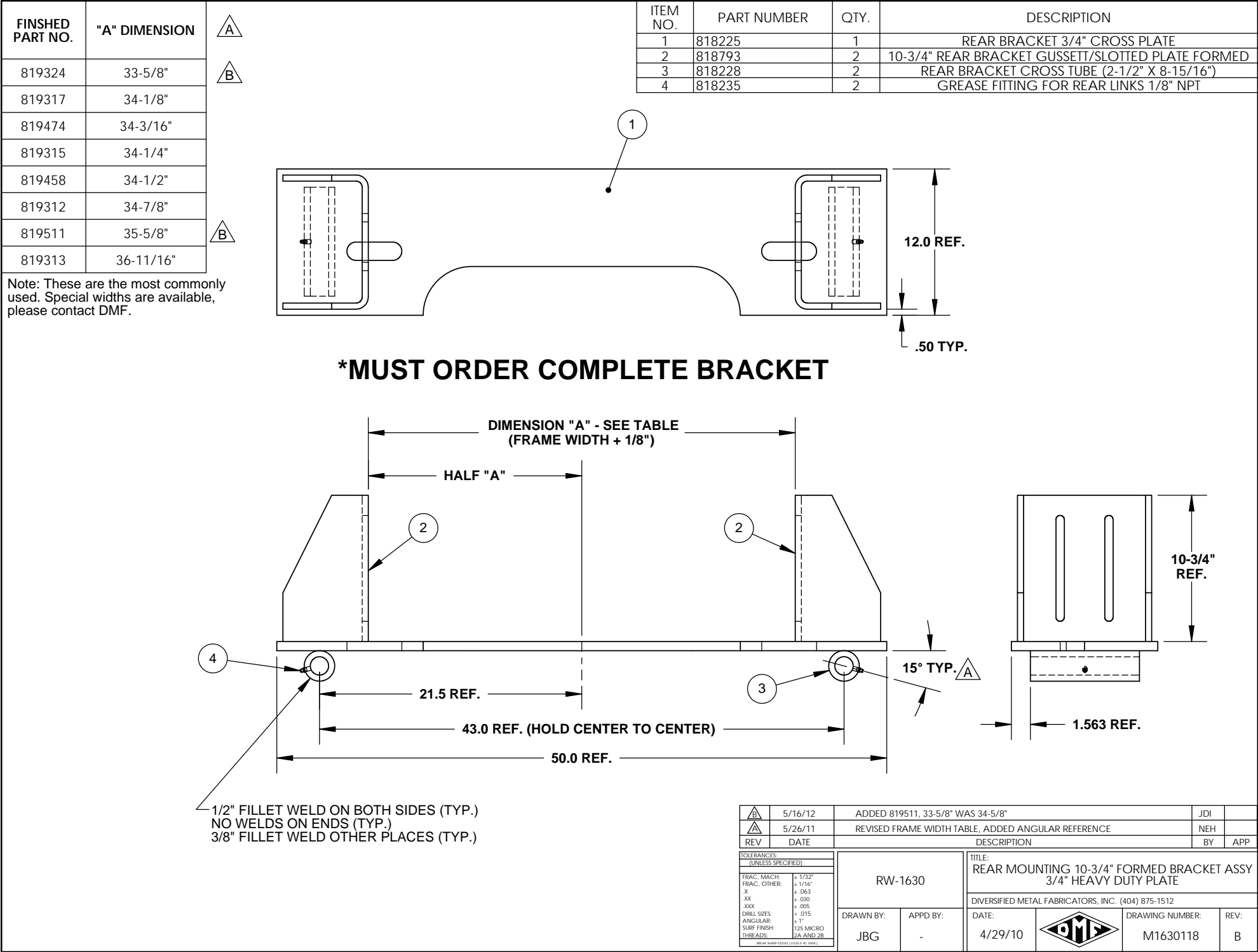


**\*MUST ORDER COMPLETE BRACKET**



1/2" FILLET WELD ON BOTH SIDES (TYP.)  
NO WELDS ON ENDS (TYP.)  
3/8" FILLET WELD OTHER PLACES (TYP.)

<div><div><div></div><div></div></div><div>5/26/11</div></div>		<div>-</div>		<div>-</div>		<div>-</div>							
REV		DATE		DESCRIPTION				BY		APP			
TOLERANCES:				TITLE:				BY				APP	
(UNLESS SPECIFIED)													
<div><div>FRAC. MACH:</div><div>± 1/32"</div></div> <div><div>FRAC. OTHER:</div><div>± 1/16"</div></div> <div><div>.XX</div><div>± .003</div></div> <div><div>.XXX</div><div>± .005</div></div> <div><div>DRILL SIZES:</div><div>± .015</div></div> <div><div>ANGULAR:</div><div>± 1°</div></div> <div><div>SURF FINISH:</div><div>125 MICRO</div></div> <div><div>THREADS:</div><div>2A AND 2B</div></div>				RW-1630				REAR MOUNTING 12" FORMED BRACKET ASSY 3/4" HEAVY DUTY PLATE					
				DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512									
DRAWN BY:		APPD BY:		DATE:		<div><div></div></div>		DRAWING NUMBER:		REV:			
JBG		-		4/29/10		<div><div></div></div>		M1630117		A			
<div>000</div>													



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# SECTION 8.0 FRONT RAILGEAR PARTS

8.1 BEFORE ORDERING PARTS – FRONT RAILGEAR..... 8-2

8.2 FRONT PARTS DETAIL DRAWING ..... 8-3

8.3 LONG ARM VARIATIONS..... 8-4

8.4 RW-1630 WHEEL & FRONT AXLE ASSEMBLY ..... 8-5

8.5 RW-1630 STUB AXLE ASSEMBLY, FRONT, DOUBLE INSULATED ..... 8-6

8.6 RW-1630 UNDER CAB FRONT RAILGEAR ASSEMBLY ..... 8-7

8.7 RW-1650 BEHIND CAB FRONT RAILGEAR ASSEMBLY ..... 8-8

8.8 RW-1630 MOUNTING TUBE VARIATIONS ..... 8-9

8.9 RW-1630 SPRING HANGER VARIATIONS ..... 8-10

## 8.1 Before Ordering Parts – Front Railgear

### Required Information for Ordering Parts:

- You must have the Railgear serial number when ordering parts. This uniquely identifies your Railgear, as it was built to your specifications, and also allows DMF to help you maintain a history of your Railgear. If you are placing a parts order through a maintenance facility, please inform them of the serial number, so that they can relay the information when placing your order.
- Returns: DMF has a Return Authorization Procedure. You must contact DMF for an RA# before returning any parts for any reason. Parts will not be credited without an RA#.
- Labor: In extremely rare situations, on a discretionary basis, and with prior approval, DMF will reimburse certain, specific labor costs. If you feel this may apply in your situation, you must contact DMF's Service Department for a Service Authorization Number (SA#). No labor will be reimbursed without an SA#. The SA# must be included on your request for reimbursement.
- Please use driver's side / passenger's side terminology (instead of left/right side) when describing issues with your Railgear. This ensures that everyone involved is clear about where the issue is occurring.

### Other Considerations for Ordering Parts:

This is a list of considerations to make before placing a parts order with DMF. There are many variations and customer requirements that we strive to accommodate, and as a result, the more information you can provide to us when placing an order, the more likely that we will be able to help you quickly and efficiently.

- Cross Tubes, Spring Hangers, and Long Arms are available in a variety of sizes and lengths. Please be sure to check drawings for details before placing your order.

### Wheels:

- If you are a customer using special wheel profiles (this is especially prevalent in Metros), please be sure to inform the DMF Parts Department that there may be a special wheel profile involved in your order.
- DMF offers both insulated and non-insulated wheels. Please confirm which wheel you need before ordering. Insulated wheels can be identified by a grooved ring machined around the inside of the Rail wheel. This grooved ring can be seen and felt, and is located about an inch in from the outside tread.

### Cylinders:

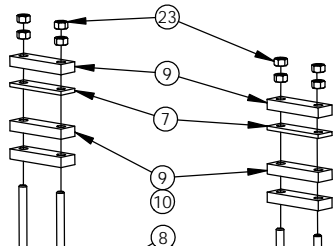
- The driver's side and passenger's side cylinders are different – please see information on drawing to determine which cylinder you need to order.

### Frame Extensions:

- Please call DMF for assistance. The truck year and model number must be provided, so that DMF can correctly identify the frame extension needed.

2	810452	2	RW-1630 CARGO
3		1	WHEEL

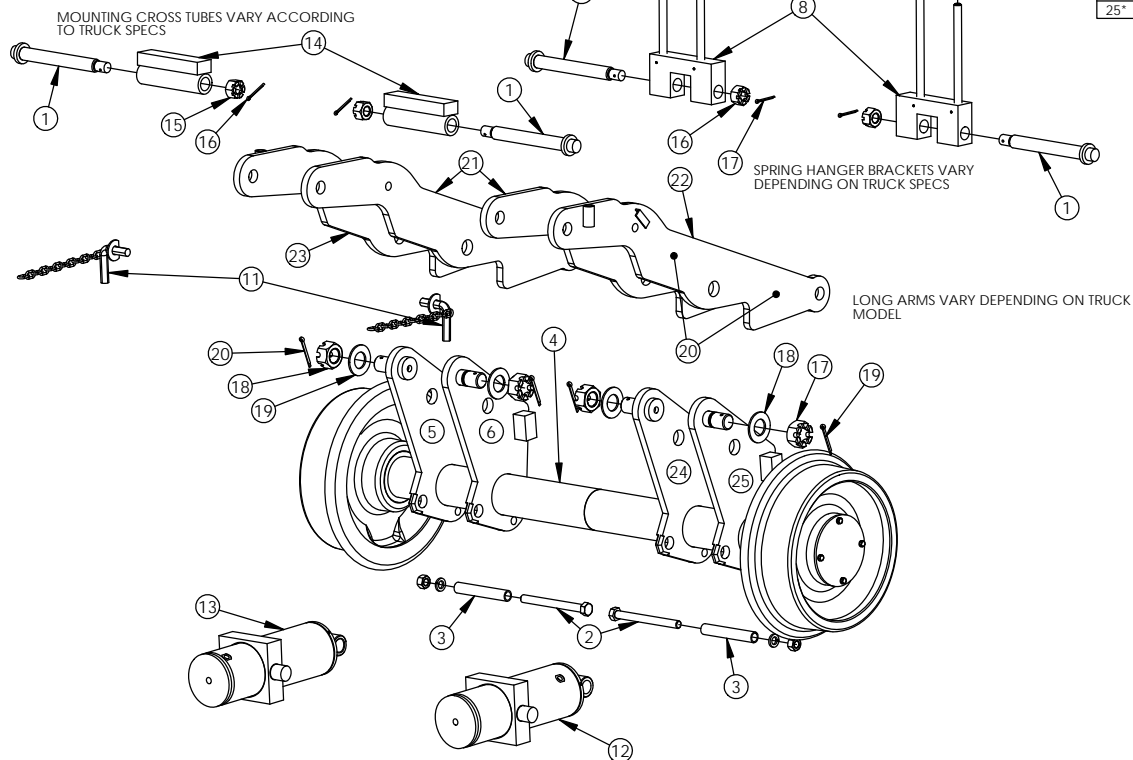
2	810452	2	RW-1630 CARGO
3		1	WHEEL



ITEM	PART NUMBER	QTY	DESCRIPTION
1	818124	4	PIN ASSEMBLY, FRONT MOUNTING (Ø1-1/4")
2	818149	2	TIE PIN ASSEMBLY, PIVOT ARM
3	818148	2	SPACER TUBE, TIE PIN (3/4" SCH 40 X 7")
4		1	WHEEL & AXLE ASSEMBLY
5*	818106	1	RW-1630 PIVOT ARM ASSY., PASSENGER SIDE OUTER ARM
6*	818108	1	RW-1630 PIVOT ARM ASSY., PASSENGER SIDE INNER ARM
7	818153	2	SPRING HANGER BRACKET RUBBER MOUNTING PAD
8		2	SPRING HANGER BRACKET ASSEMBLY
9	818160	6	SPRING HANGER BRACKET MOUNTING SPACER BAR (1")
10	818158	(REF.)	SPRING HANGER BRACKET MOUNTING SPACER BAR (1/2" OPTIONAL)
11			PIN-OFFS
12		1	HYDRAULIC CYLINDER ASSEMBLY, FRONT DRIVER'S SIDE
13		1	HYDRAULIC CYLINDER ASSEMBLY, FRONT PASSENGER'S SIDE
14		2	CROSS TUBE DETAIL, FRONT - SEE SECTION 5.5
15	818127	4	NUT, SLOTTED HEX (1"-8)
16	818128	4	COTTER PIN (3/16" X 2")
17	818134	4	NUT, SLOTTED HEX (1-1/2" - 6)
18	818136	4	FLAT WASHER (1-1/2")
19	818137	4	COTTER PIN (1/4" X 2-1/2")
20	818487	4	J- CLIP - 1/2" DIA (FOR AIR BRAKE HOSES) - QTY. 2 EACH SIDE
21			INNER LONG ARM ASSEMBLY
22			OUTER LONG ARM ASSEMBLY
23	818161	8	HEX NUT (3/4" - 10)
24*	818110	1	RW-1630 PIVOT ARM ASSY., DRIVER SIDE INNER ARM
25*	818107	1	RW-1630 PIVOT ARM ASSY., DRIVER SIDE OUTER ARM

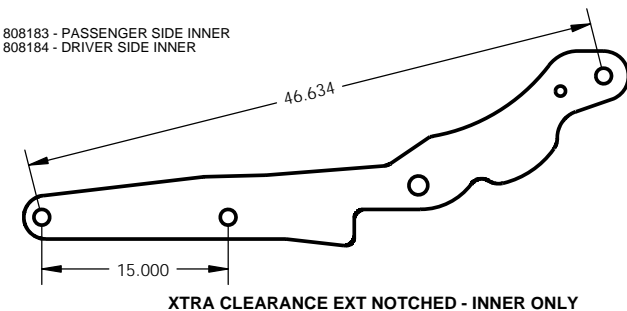
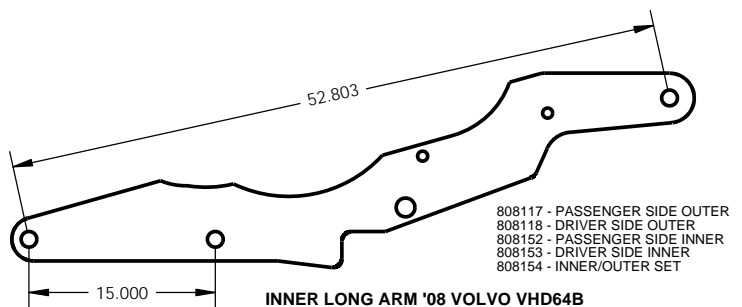
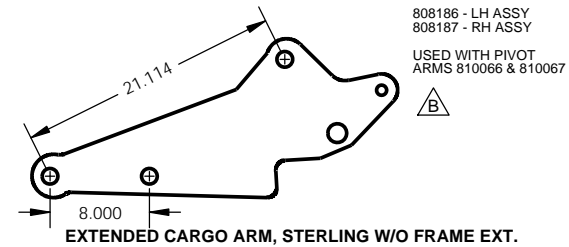
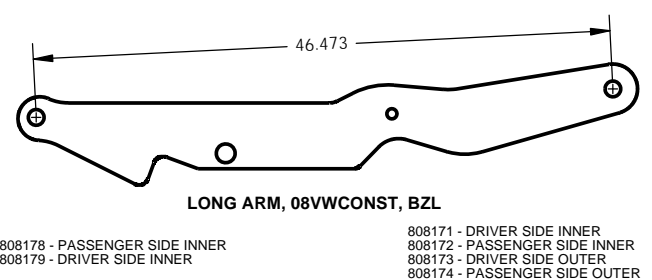
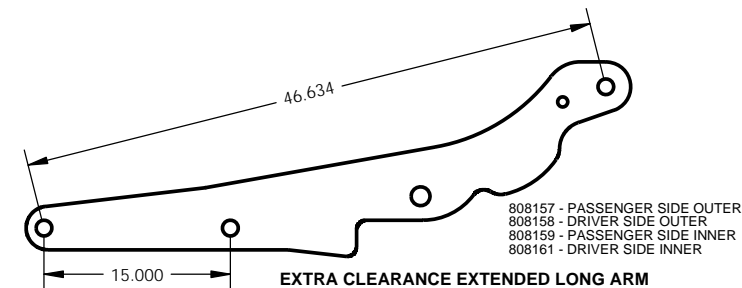
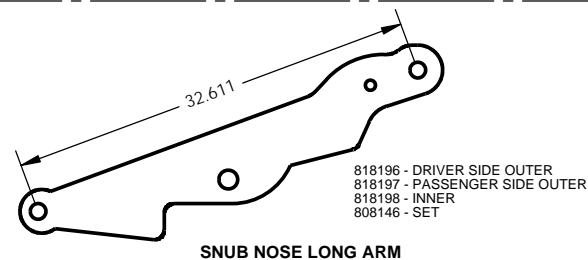
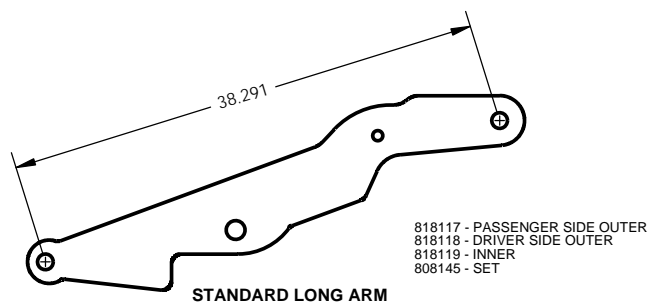
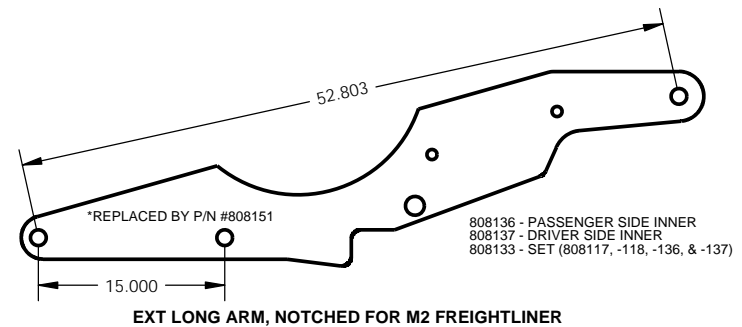
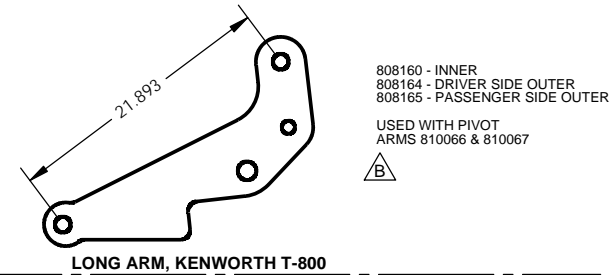
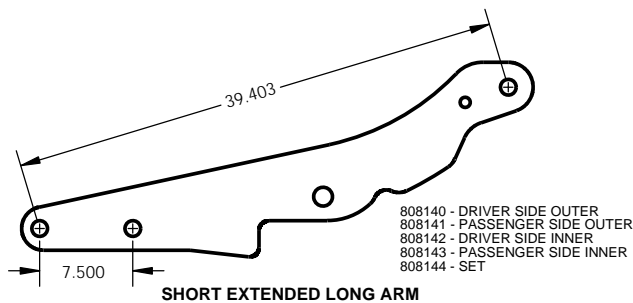
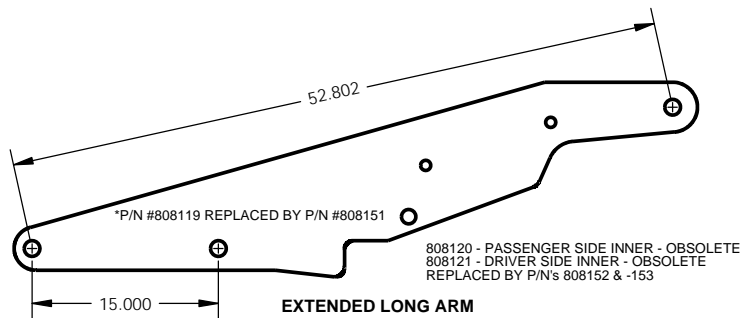
ITEM #'S 5, 6, 24, & 25 ARE COMPONENTS OF ITEM #4 RESPECTIVELY.

**\*MUST HAVE SERIAL # WHEN ORDERING PARTS\***




*Drawing is for illustrative purposes. Your parts may not be exactly as pictured.*

[illegible]



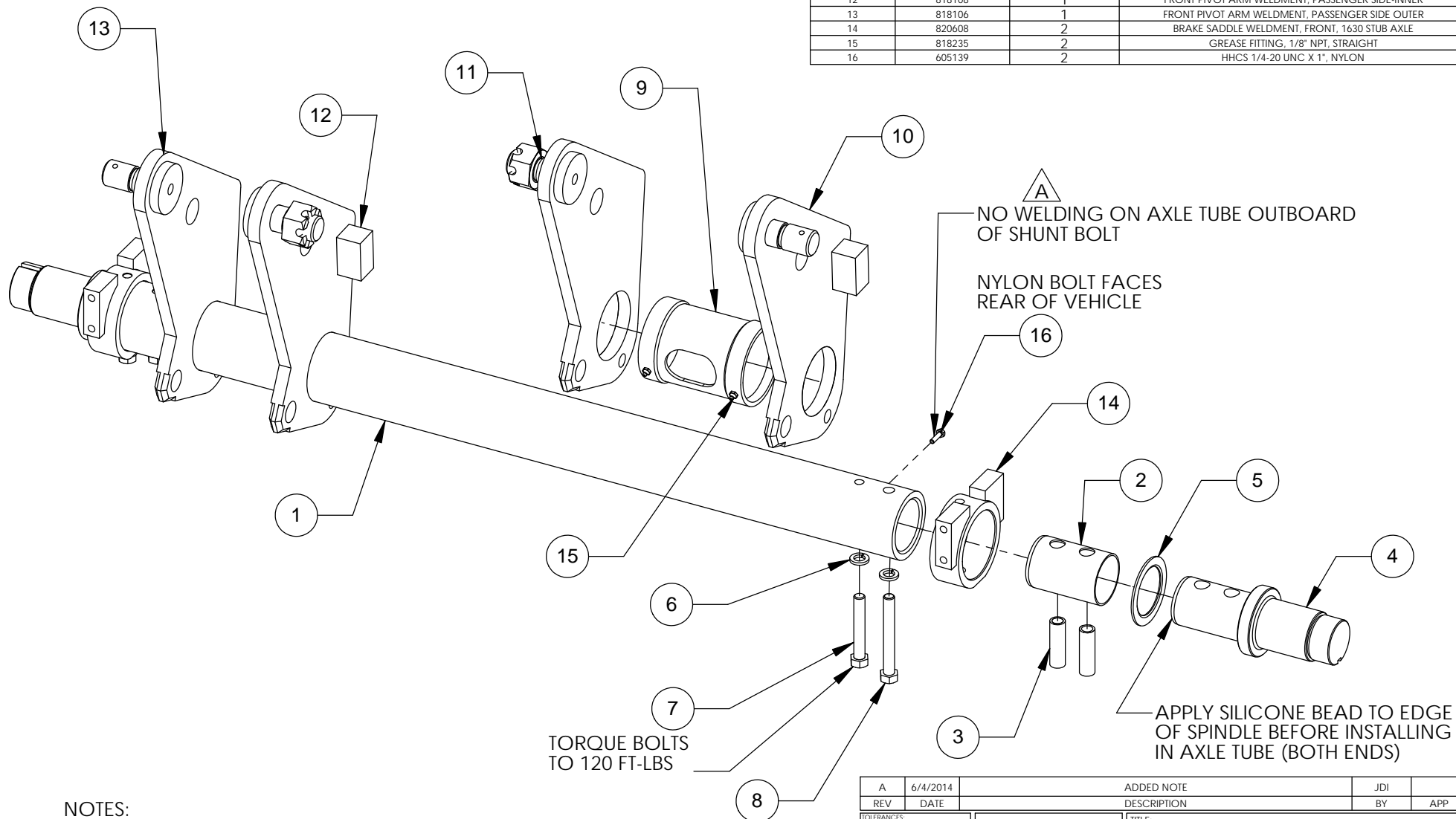
**NOTE:**  
IF ORDERING DRIVER'S SIDE OUTER ARM, MUST HAVE SERIAL #  
FOR A REPLACEMENT SERIAL TAG. (LONG ARM WILL SHIP WITH  
TAG ATTACHED)

	1/16/12	UPDATED EXT CARGO ARM. ADDED NOTES FOR 1-800-CARGO LONG ARM AND EXT CARGO ARM	JTM
	5/26/11	ADDED PART #S FOR EXTENDED CARGO ARM	NEH
REV	DATE	DESCRIPTION	BY APP
<b>CHANGES</b>			
1. 1/16/12			
2. 5/26/11			
3. 5/26/11			
4. 5/26/11			
5. 5/26/11			
6. 5/26/11			
7. 5/26/11			
8. 5/26/11			
9. 5/26/11			
10. 5/26/11			
11. 5/26/11			
12. 5/26/11			
13. 5/26/11			
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ITEM NO.	PART NUMBER	Exploded/QT.Y.	DESCRIPTION
1	820600	1	AXLE TUBE DETAIL, 1630 STUB AXLE
2	820603	2	INSULATOR TUBE, 1630 STUB AXLE
3	820604	4	BOLT INSULATOR, 1630 STUB AXLE
4	820601	2	STUB AXLE DETAIL, 1630, INSULATED
5	820602	2	INSULATOR DISC, 1630 STUB AXLE
6	108268	4	5/8" LOCK WASHER, GRADE 8
7	820486	2	HHCS 5/8-11 UNC x 4", GRADE 8
8	605120	2	HHCS 5/8-11 UNC X 5", GRADE 8
9	820613	1	STUB AXLE SLEEVE, 1630
10	818107	1	FRONT PIVOT ARM WELDMENT, DRIVER SIDE OUTER
11	818110	1	FRONT PIVOT ARM WELDMENT, DRIVER SIDE - INNER
12	818108	1	FRONT PIVOT ARM WELDMENT, PASSENGER SIDE-INNER
13	818106	1	FRONT PIVOT ARM WELDMENT, PASSENGER SIDE OUTER
14	820608	2	BRAKE SADDLE WELDMENT, FRONT, 1630 STUB AXLE
15	818235	2	GREASE FITTING, 1/8" NPT, STRAIGHT
16	605139	2	HHCS 1/4-20 UNC X 1", NYLON



#### NOTES:

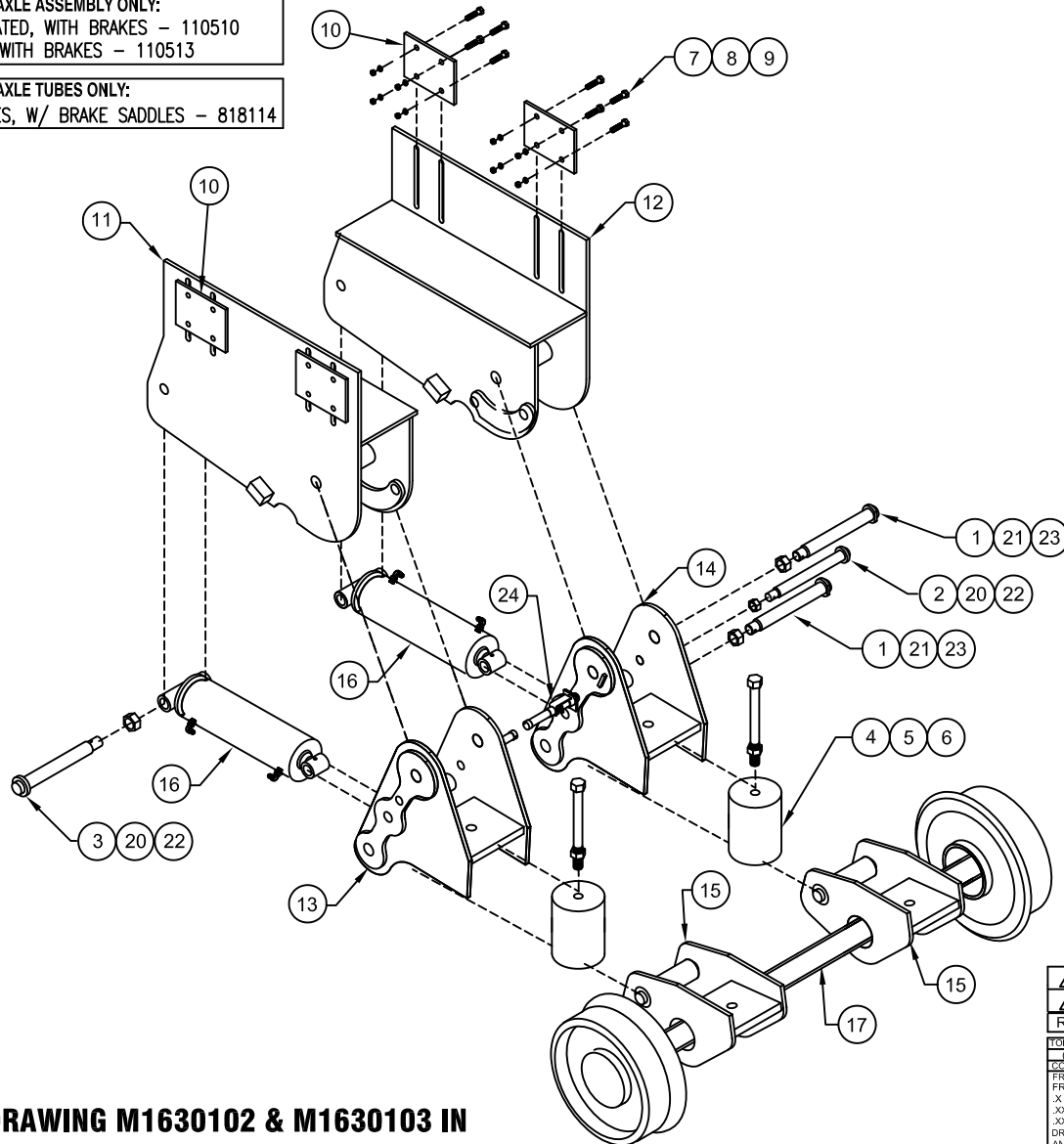
1. INSTALL ALL INSULATORS ON STUB AXLE BEFORE PRESSING INTO AXLE TUBE
2. CHECK FOR ZERO CONTINUITY AFTER ASSEMBLY

A	6/4/2014	ADDED NOTE		JDI	
REV	DATE	DESCRIPTION		BY	APP
TOLERANCES: (UNLESS SPECIFIED)		RW-1630		TITLE: 1630 STUB AXLE ASSEMBLY, FRONT, DOUBLE INSULATED	
FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" X ± .063 XX ± .030 XXX ± .005 - .015 DRILL SIZES: ANGULAR: SURF FINISH: THREADS:				DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512	
		DRAWN BY: BJF	APPD BY: -	DATE: 9/26/12	
				DRAWING NUMBER: 820605	REV: A

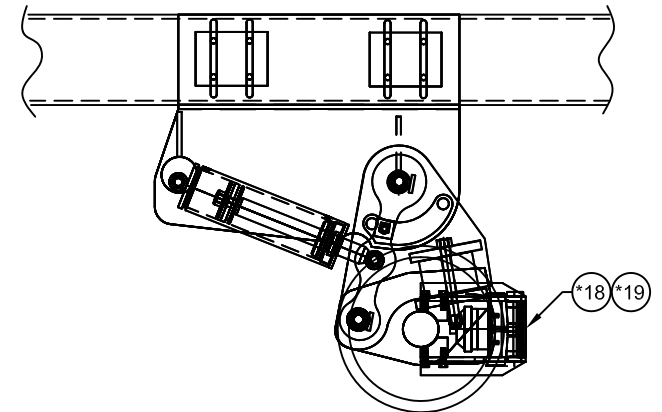
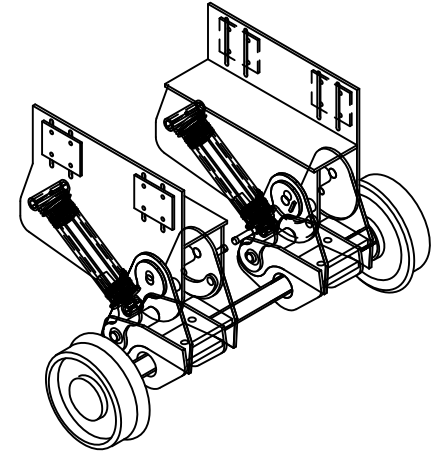
ITEM	PART NO.	QTY	DESCRIPTION
13	110400	1	UPPER ARM ASSEMBLY (DRIVER'S SIDE)
14	110500	1	UPPER ARM ASSEMBLY (PASSENGER'S SIDE)
15	110700	2	LOWER ARM ASSEMBLY
16	241800	1	HYDRAULIC CYLINDER ASSEMBLY (4-1/2")
17	REF.	1	WHEEL & AXLE ASSY., w/COBRA AIR BRAKES
18	818396	1	COBRA AIR BRAKE ASSEMBLY (DRIVER'S SIDE)
19	818397	1	COBRA AIR BRAKE ASSEMBLY (PASSENGER'S SIDE)
20	818127	4	NUT, SLOTTED HEX (1"-8)
21	818256	4	NUT, SLOTTED HEX (1-1/4"-7)
22	108258	4	COTTER PIN (3/16"x 2")
23	818137	4	COTTER PIN (1/4"x 2-1/2")
24	818710	2	AIR REMOTE PIN-OFF ASSEMBLY (SEE PAGE # 16)

UNDER CAB AXLE ASSEMBLY ONLY:  
NON-INSULATED, WITH BRAKES - 110510  
INSULATED, WITH BRAKES - 110513

UNDER CAB AXLE TUBES ONLY:  
FRONT TUBES, W/ BRAKE SADDLES - 818114



ITEM	PART NO.	QTY	DESCRIPTION
1	110010	4	PIN ASSEMBLY, HOUSING
2	110015	2	PIN ASSEMBLY, ROD END
3	110020	2	PIN ASSEMBLY, CYLINDER TUBE END
4	110025	2	SPRING (CENTURY DM0376)
5	110030	2	BOLT, SPRING (1"-8x 9" Gr8)
6	110035	2	NUT, SPRING (1"-8 TYPE C)
7	110040	16	BOLT, FRAME MOUNTING (5/8"-11 x 2-1/2"Gr5)
8	110045	16	NUT, FRAME MOUNTING (5/8"-11 TYPE C)
9	110050	16	LOCK WASHER, FRAME MOUNTING (5/8")
10	818221	4	PLATE, FRAME BACKING
11	110100	1	FRAME BOX ASSEMBLY (DRIVER'S SIDE)
12	110200	1	FRAME BOX ASSEMBLY (PASSENGER'S SIDE)



\* NOTE: FOR MORE INFORMATION ON AIR BRAKES (ITEM #'s 18 & 19) SEE SECTION 5.2 - OPTIONS

REV	DATE	DESCRIPTION	BY	APP
1				
<div> <div> TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" X: ± .003 XX: ± .030 XXX OR .XXXX: ± .005 DRILL SIZES: +.015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B </div> <div> DRAWN BY: KLC APPD BY: </div> </div> <div> <div> TITLE: RW-1630 UNDER-CAB FRONT RAILGEAR ASSEMBLY DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512 </div> <div> DATE: 10/09/01 DRAWING NUMBER: UC110005 REV: # </div> </div>				

**\*SEE DRAWING M1630102 & M1630103 IN  
SECTION 5 FOR AXLE & WHEEL ASSEMBLY PARTS.**

ITEM	PART NO.	QTY	DESCRIPTION
12	108252	4	HEX HEAD BOLT (HHCS 1"-8 x 8" Gr8)
13	108256	4	SLOTTED HEX NUT (SLHN 1"-8)
14	108258	4	COTTER PIN (3/16"x 2")
15	108200	1	RW-1650 BEHIND CAB NON-INSULATED AXLE ASSEMBLY
16	108231	1	BC FRONT AXLE TUBE WELDMENT ASSEMBLY
17	820401	1	RW-1650 AXLE, HD (4" X 64") - AXLE ONLY
18	108262	12	MOUNTING BOLTS (5/8"-11 x 2-1/2") - Grade 8
19	108264	12	MOUNTING HEX NUTS (5/8"-11 ESNA)
20	108266	16	STRAP MOUNTING BOLTS (HHCS 5/8"-11 x 1-1/4" Gr8)
21	108268	16	LOCK WASHER (5/8"-11)
22	108045	2	PIN-OFF ASSEMBLY (AUXILIARY)
23	108044	2	PIN-OFF CHAIN (3/16"x 12")
24	78750	2	AIR BRAKE ASSEMBLY (see PAGE # 17 for MORE DETAILS)

#### 1650 & BEHIND CAB WHEELS:

NON-INSULATED, 1650 WHEEL w/ RACES - 800015

INSULATED, 1650 WHEEL w/ RACES - 800016

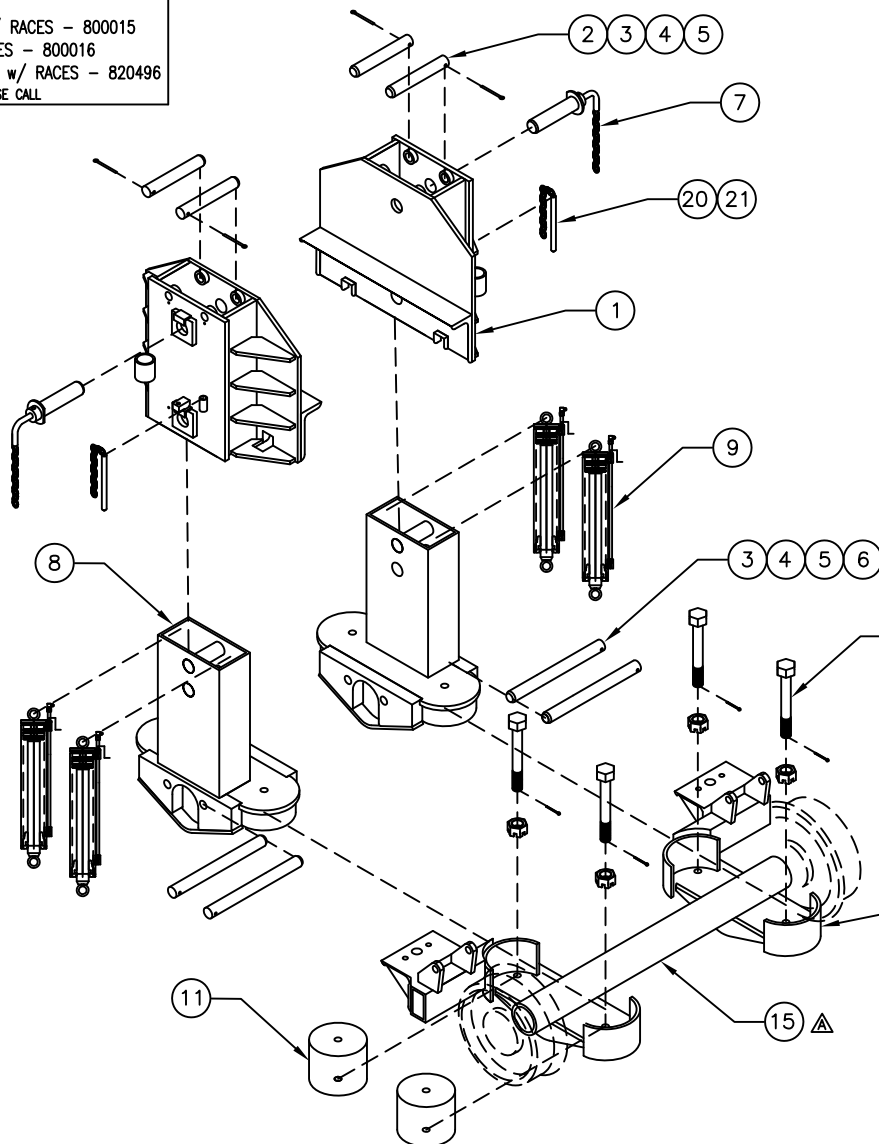
INSULATED, 2 PIECE 1650 WHEEL w/ RACES - 820496

\*NOTE: SPECIAL PROFILE WHEELS - PLEASE CALL

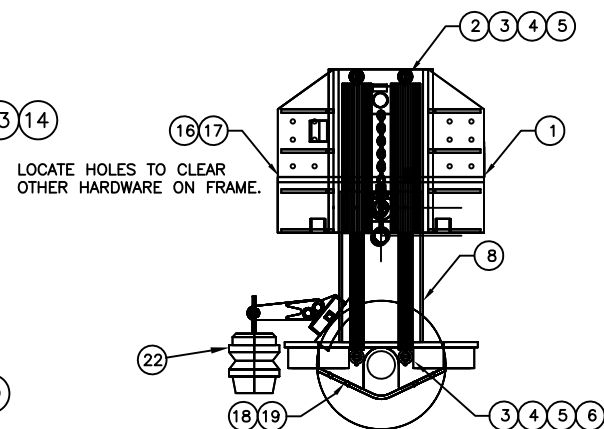
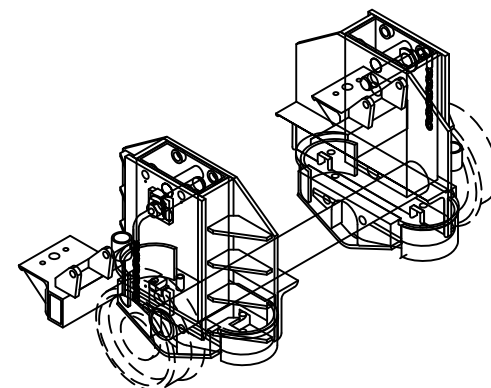
#### 1650 & BEHIND CAB BEARING RACE:

TIMKEN 6420 BEARING RACE




- 800125

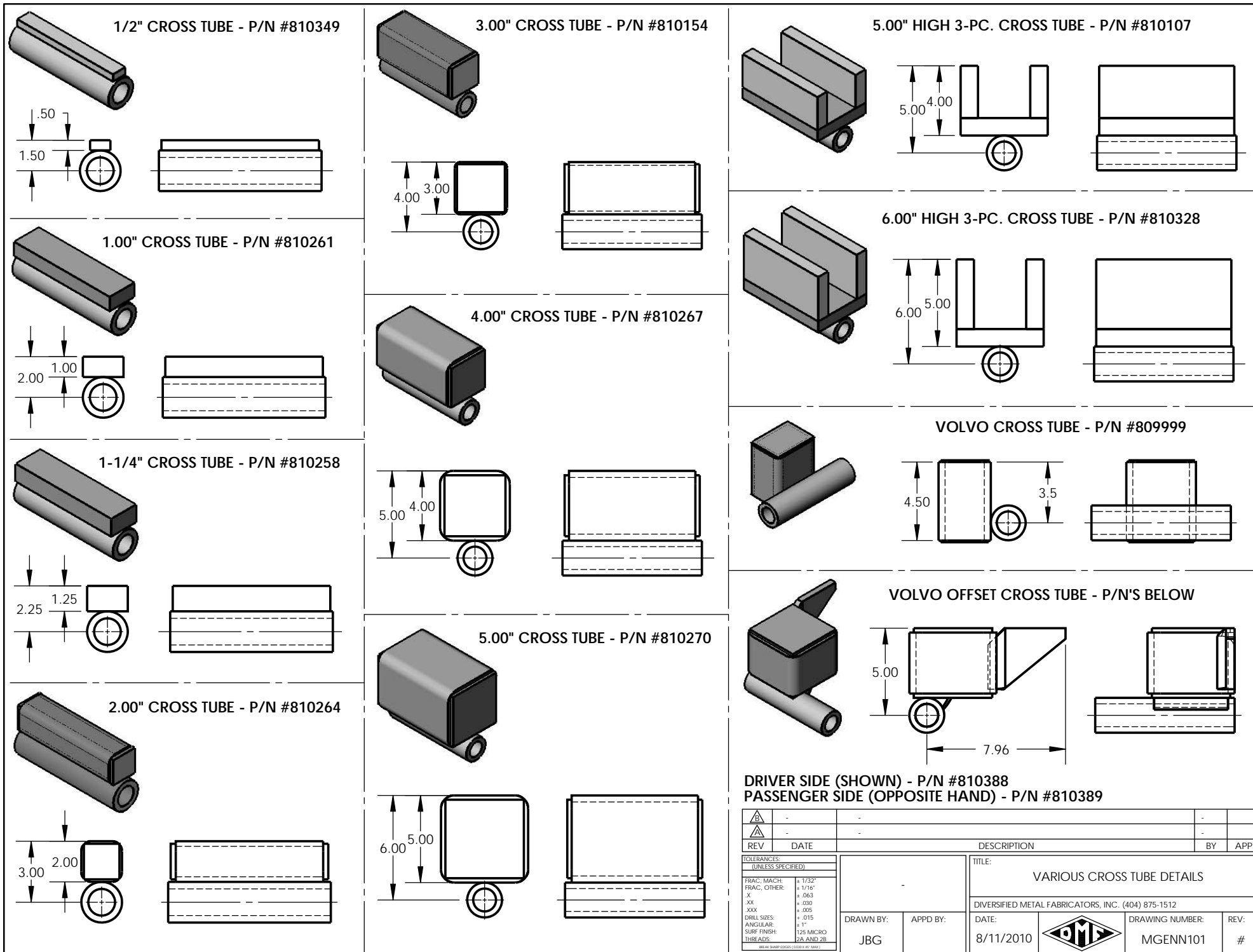


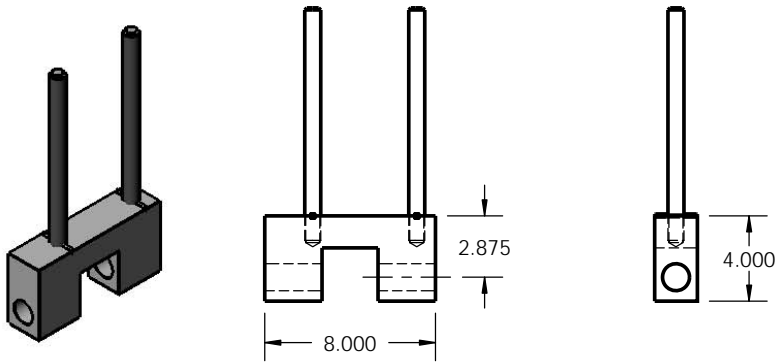
ITEM	PART NO.	QTY	DESCRIPTION
1	108015	2	BEHIND CAB FRAME BOX ASSEMBLY
2	108056	4	UPPER CYLINDER PIN DETAIL
3	108060	8	BANJO PIN (1/4"x 3")(REID ROD END FORGED)
4	108062	8	HEX HEAD BOLT (HHCS 5/16"-18 x 1")
5	108064	8	LOCK WASHER (5/16"-18)
6	108074	4	LOWER CYLINDER PIN DETAIL
7	108041	2	1-5/8" PIN-OFF ASSY., W/ CHAIN
8	108080	2	SLIDE TUBE WELDMENT
9	108100	4	HYDRAULIC CYLINDER ASSEMBLY
10	108200	1	BEHIND CAB AXLE ASSEMBLY
11	108250	4	MARSHMALLOW SPRINGS (CENTURY DM 0376)(6"x 1"x 5")



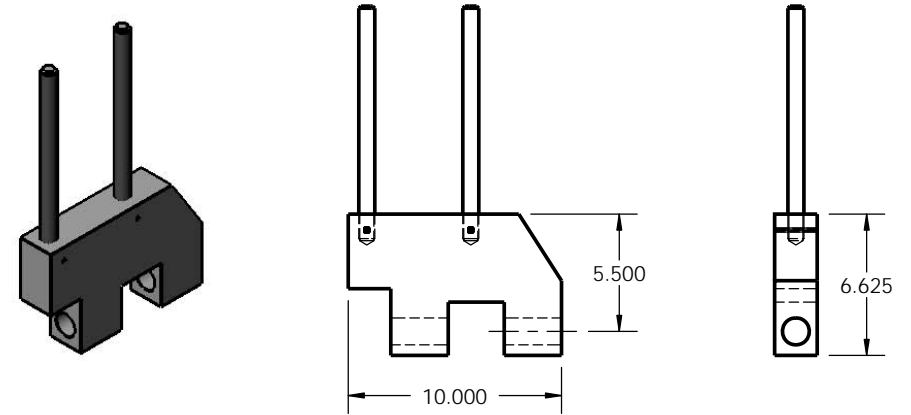
**\*SEE DRAWING M1630103 FOR REAR PARTS & WHEEL ASSEMBLY PROCEDURES.**

	8/11/10	CHANGED ITEM #7 108042 TO P/N #108041			JBG		
	5/24/10	ADDED ITEM #15, NOTES, & PARTS LIST REFERENCE TABLES			JBG		
REV	DATE	DESCRIPTION				BY	APP
TOLERANCES (UNLESS SPECIFIED) COMMON SENSE PREVAILS		TITLE:  RW-1650 BEHIND-CAB FRONT RAILGEAR ASSEMBLY					
FRACTIONAL: ± 1/32" DECIMAL: ± 0.005" HOLE: ± 0.005" DRILL SIZES: ± 0.015" ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 1/2 AND 28							
DRAWN BY: MRV		APPD BY: TSH		DATE: 2/26/96		DRAWING NUMBER: BC108005A	REV: B

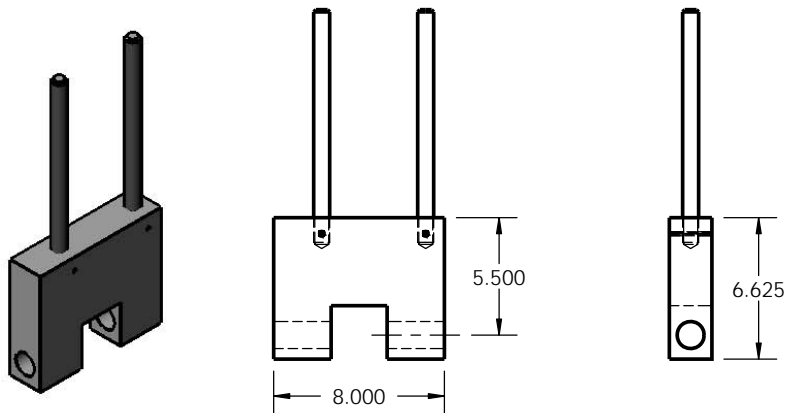




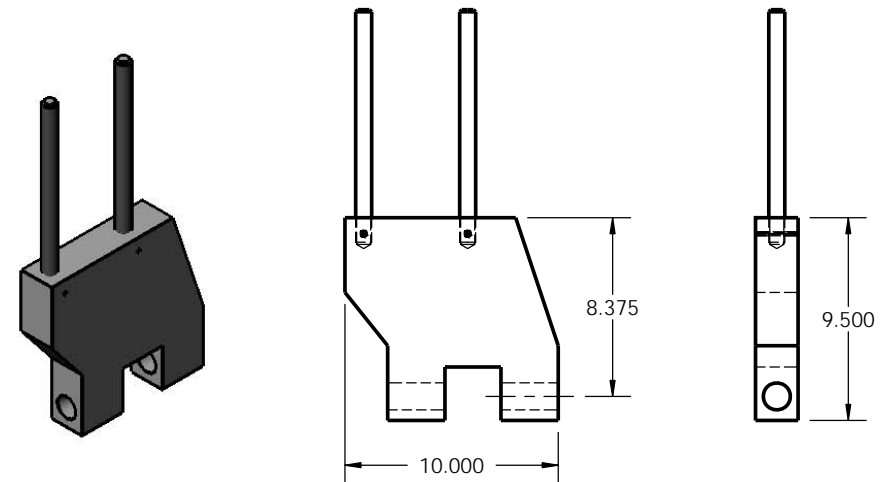
4" SPRING HANGER - P/N #818155



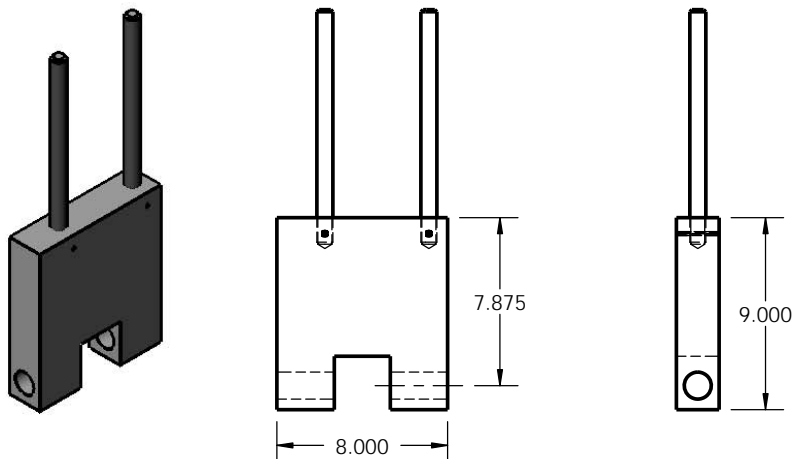
6-5/8" OFFSET SPRING HANGER - P/N #818172



6-5/8" SPRING HANGER - P/N #818170



9-1/2" OFFSET SPRING HANGER - P/N #810136



9" SPRING HANGER - P/N #818142

REV	DATE	DESCRIPTION			BY APP
TOLERANCES: (UNLESS SPECIFIED) FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .XX ± .063 .XXX ± .030 .XXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B		TITLE: VARIOUS SPRING HANGER BRACKETS DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512			
DRAWN BY: JBG		APPD BY:		DATE: 4/01/10	
				DRAWING NUMBER: MGENN100	REV: #

# DMF LIMITED WARRANTY POLICY

**Diversified Metal Fabricators (DMF)** products are designed to provide the utmost service and reliability. Competent workmen, guided by stringent quality standards, manufacture the products from high-grade material. **DMF** warrants products of its manufacture to be free of defects in material and workmanship, under normal use and service, for a period of **ONE CALENDAR YEAR**. **DMF's** obligation under this warranty is limited to repairing or replacing at its factory, or other location designated by us, any part or parts there-of which shall, within 30 DAYS of the date of failure or notice of defect, be returned, and which upon examination shall appear to **DMF's** satisfaction to have been defective. Such repair or replacement does not include the cost of installing the new part or any other expenses incident thereto; however, the outbound direct ground freight on the part will be prepaid to locations within the continental United States and Canada. **DMF** shall not be liable for other loss, damage, or expense directly or indirectly arising from the use of its products.

Ordinary wear and tear, abuse, misuse, neglect, or alteration is not covered by this warranty. **DMF** assumes no liability for expenses or repairs made outside its factory except by written consent. Warranty is null and void if instructions and operating procedures specifically referring to warranty coverage are not followed.

Equipment or parts not manufactured by this company, but which are furnished in connection with **DMF** products are covered directly and solely by the warranty of the manufacturer supplying them.

This warranty is in lieu of other warranties, expressed or implied, including any implied warranties of merchantability or fitness for a particular purpose and any liability for special or consequential damages.

All warranty claims must reference a serial number. Returns must reference a RA number.



FOR ALL STRUCTURAL WELDS, EITHER LOW HYDROGEN ROD OR DUAL SHIELD MIG WIRE SHOULD BE USED.

DO NOT ATTACH THE WELDING MACHINE GROUND CLAMP ON RAILWHEELS. THIS WILL CAUSE ARCING ACROSS THE BEARINGS INSIDE THE WHEEL & LEAD TO PREMATURE BEARING FAILURE.

GRADE 8 BOLTS MUST BE USED WHEN MOUNTING FRAME EXTENSIONS TO TRUCK FRAME.

ONCE SPRING BRACKET IS FINALLY SET, WHERE CLEARANCE ALLOWS, LEAVE 1" OF THREADED ROD EXPOSED ABOVE NUT (2 THREAD MIN.)

ONCE FINAL ALIGNMENT & WEIGHTS ARE SET, FRONT CROSS TUBE MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) TO TRUCK FRAME OR FRAME EXTENSIONS ALL THE WAY AROUND.

ONCE FINAL ALIGNMENT & WEIGHTS ARE SET, IF SHIMS REQUIRED, FULLY WELD ALL SHIMS IN ALL LOCATIONS, IN ONE PLACE. IF MORE THAN ONE SHIM PER LOCATION, THEN ALL SHIMS USED AT LOCATIONS SHOULD BE WELDED TO ONE ANOTHER.

INSTALL SHIM HERE. MAX ALLOWABLE 1/4" CONTACT DMF IF OUTSIDE MAX. RANGE

NOTE: SHIMS SHOULD BE PLACED ON BOTH PIVOT ARMS FOR A GIVEN SIDE OF THE TRUCK.

25 1/2" ± 1/2"

SPRING DISTANCE  
4" MAX

SPACER (TOP)

RUBBER SPACER (MUST BE DIRECTLY ON TOP OF LEAF SPRINGS)

SPRING BRACKET

SPRING BRACKET HEIGHT

12 3/4" ± 1/2"

6" MAX

LONG ARM

REAR MOUNTING PIN

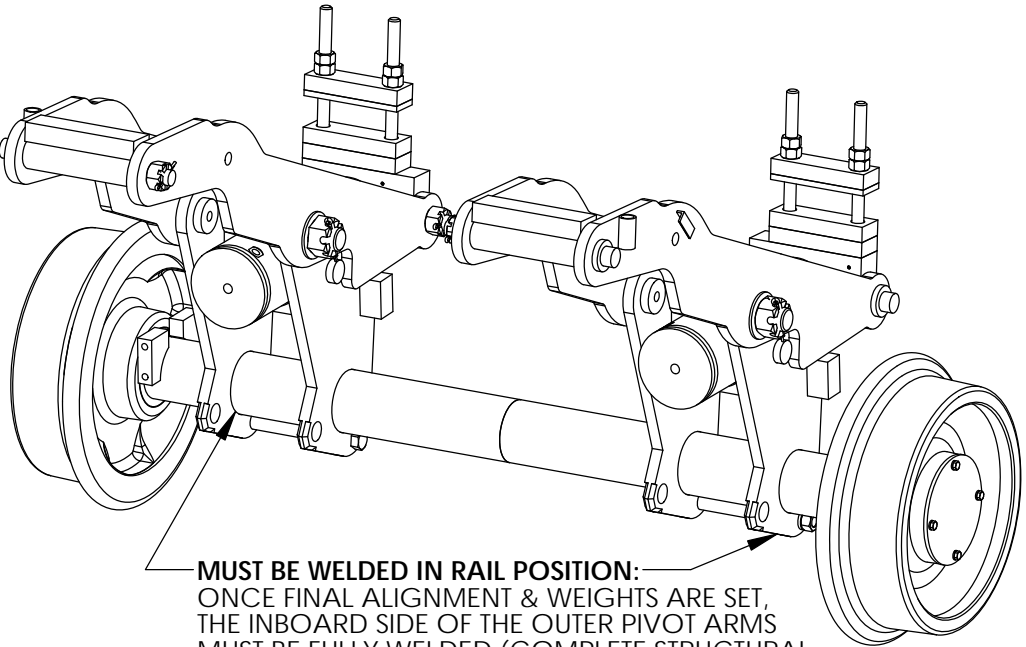
**MUST BE WELDED IN RAIL POSITION:**  
THE INBOARD SIDE OF THE OUTER PIVOT ARM MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) ALL THE WAY AROUND, ONCE FINAL ALIGNMENT & WEIGHTS ARE SET.

**DO NOT WELD DRIVER SIDE PIVOT ARMS WITH STUB AXLE.**

NO WELDING ON AXLE TUBE OUTBOARD OF SHUNT BOLT

**MUST BE WELDED IN RAIL POSITION:**  
SLEEVE MUST BE FULLY WELDED IN THE OPENINGS ON BOTH SIDES OF THE SLEEVE, ONCE FINAL ALIGNMENT & WEIGHTS ARE SET.

FRONT STUB AXLE WELD-OUT



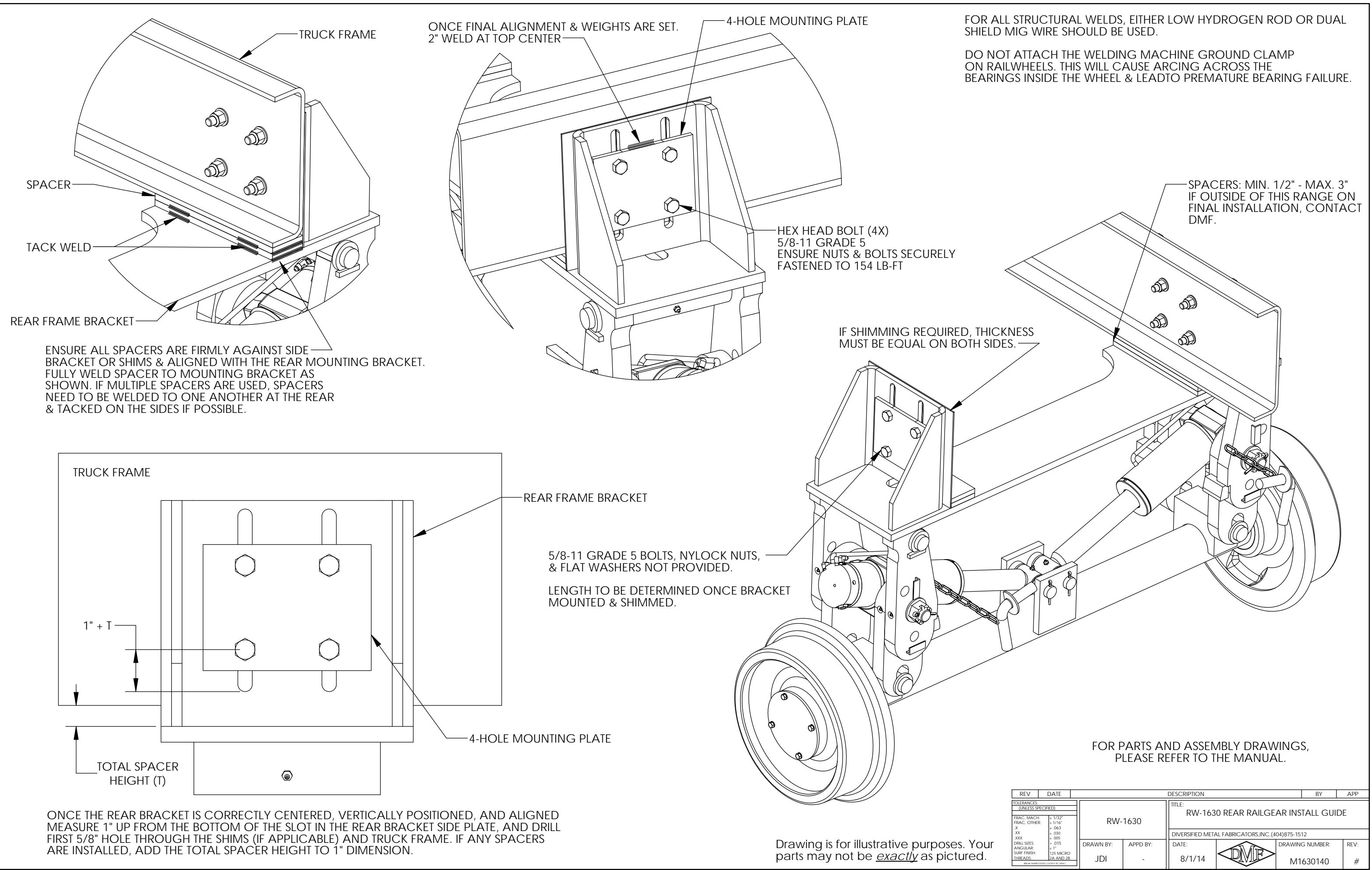
**MUST BE WELDED IN RAIL POSITION:**  
ONCE FINAL ALIGNMENT & WEIGHTS ARE SET, THE INBOARD SIDE OF THE OUTER PIVOT ARMS MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) ALL THE WAY AROUND.

FOR PARTS AND ASSEMBLY DRAWINGS, PLEASE REFER TO THE MANUAL.

*Drawing is for illustrative purposes. Your parts may not be exactly as pictured.*

REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED)				
FRACTIONAL:		± 1/32"	RW-1630	
DECIMAL:		± .005		
HOLE:		± .003		
DRILL SIZE:		± .015		
SURF FINISH:		125 MICRO		
THREADS:		2A AND 2B	DRAWN BY: JDI	
			APPD BY: -	
			DATE: 8/1/14	
			DRAWING NUMBER: M1630139	
			REV: #	

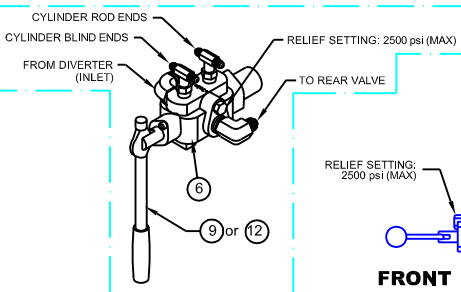




**NOTE: DMF ONLY PROVIDES HYDRAULIC HOSES FROM FRONT & REAR CONTROL VALVES TO RAILGEAR CYLINDERS. CUSTOMER IS RESPONSIBLE FOR ALL OTHER SYSTEM COMPONENTS (TANK, DIVERTER, PTO, PUMP, FILTER, PRESSURE RELIEF VALVE, ETC.)**

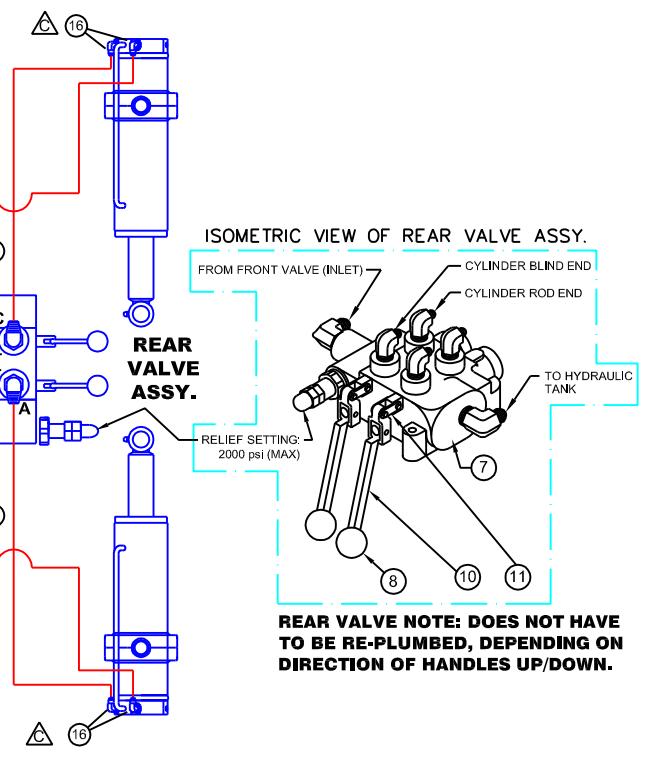
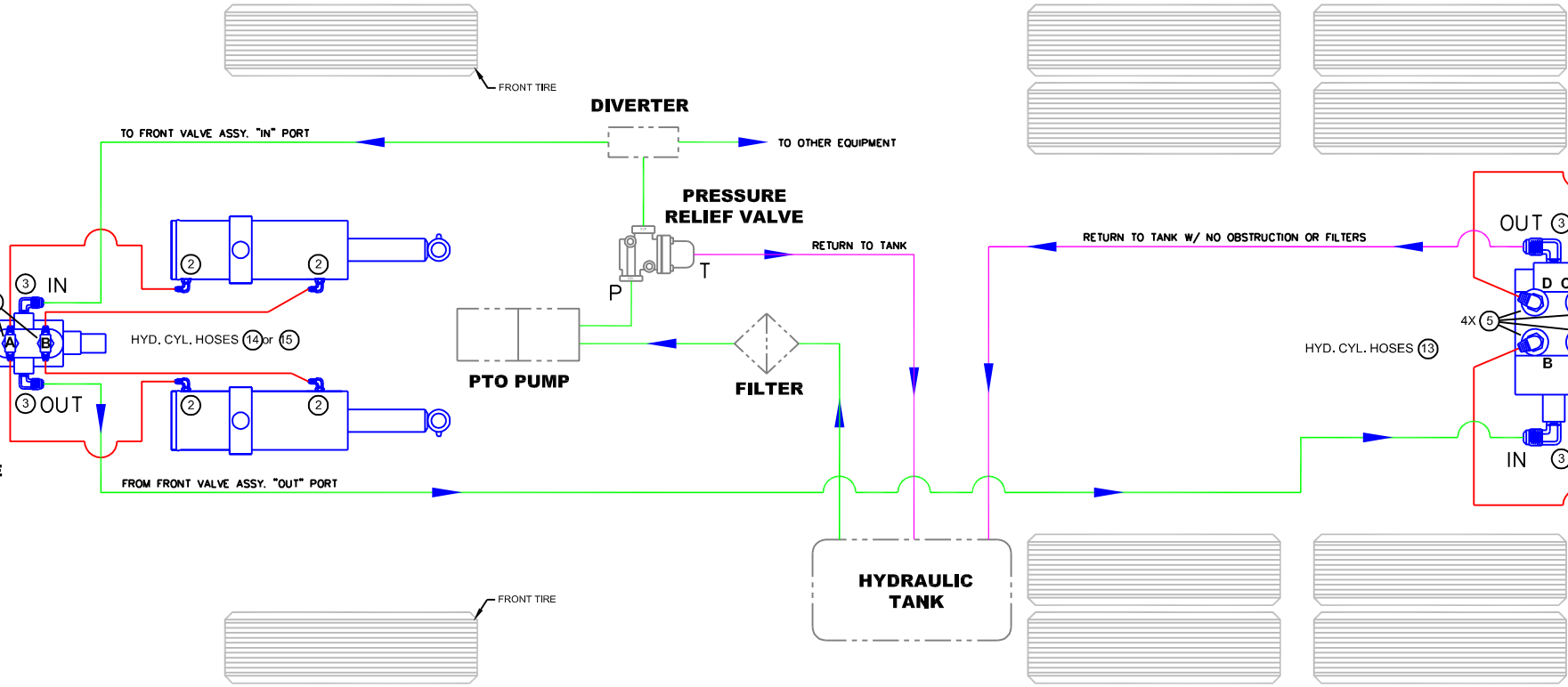
NOTE: ON THE FRONT VALVE THE RELIEF SETTING MAY BE LOCATED IN DIFFERENT LOCATIONS, DEPENDING ON THE MANUFACTURING BRAND. ALL ELSE REMAINS THE SAME. WE SHOW THE TWO MOST COMMON LOCATIONS BELOW FOR THE RELIEF SETTING.

ISOMETRIC VIEW OF FRONT VALVE ASSY.



**FRONT VALVE NOTE: DEPENDING ON DIRECTION OF HANDLE UP/DOWN, YOU MUST RE-PLUMB YOUR HOSES OPPOSITE FROM ABOVE. SEE DIAGRAM BELOW.....**

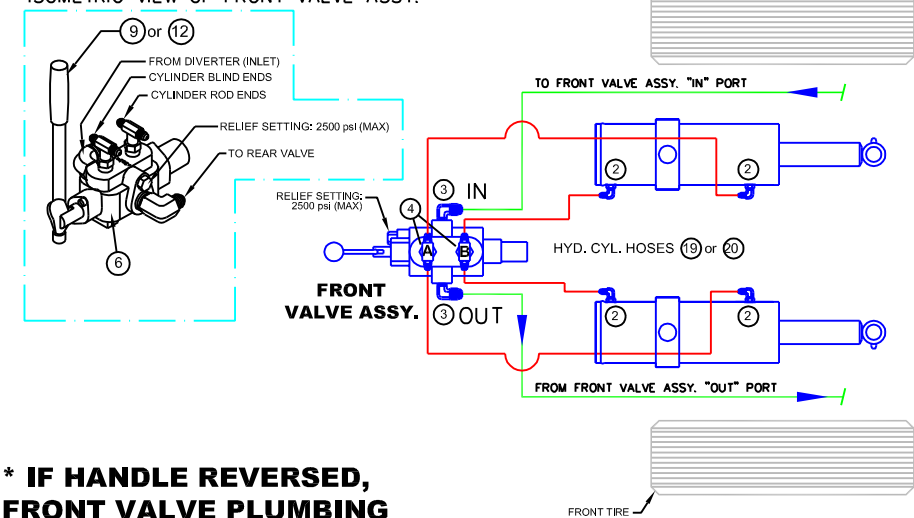
**PULL TO RAISE  
PUSH TO LOWER**



**REAR VALVE NOTE: DOES NOT HAVE TO BE RE-PLUMBED, DEPENDING ON DIRECTION OF HANDLES UP/DOWN.**

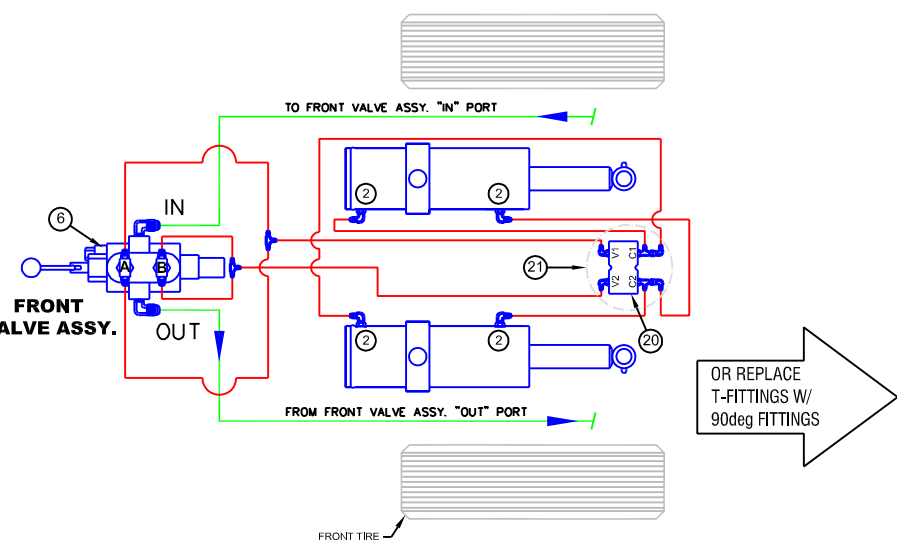
**PLUMBING FOR REVERSED HANDLE ONLY \***

ISOMETRIC VIEW OF FRONT VALVE ASSY.



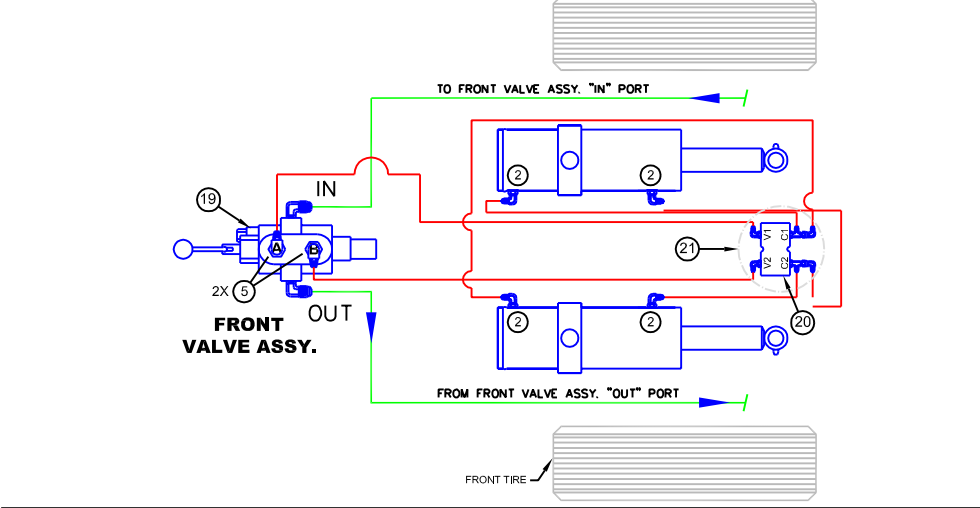
**\* IF HANDLE REVERSED, FRONT VALVE PLUMBING MUST BE REVERSED**

**PLUMBING FOR EXTERNAL LOCKING VALVE WITH T FITTINGS ON FRONT VALVE (STD. HANDLE)**



OR REPLACE T-FITTINGS W/ 90deg FITTINGS

**PLUMBING FOR EXTERNAL LOCKING VALVE W/ 90deg FITTINGS ON FRONT VALVE (STD. HANDLE)**



**SEE SECTION 4.3 OF MANUAL WHICH SPECIFIES HYDRAULIC SYSTEM REQUIREMENTS**





**LUBRICATION SPECIFICATIONS**

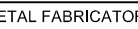
**HYDRAULIC OIL:**

**\* ASTM D6158 HM (UNAX RX-46 HYDRAULIC OIL, SHELL TELLUS EE 46 OR EQUAL)  
OR  
\* SOME CUSTOMERS OPERATE ON DEXRON III ATF**

ITEM	PART NO.	QTY	DESCRIPTION
1	(REF.)	1	PUMP (EXISTING) 5 to 7 gpm @ 2000 psi MINIMUM
2	241006	4	FITTING, ELBOW (#04 JIC x #06 SAE O-RING)
3	810302	4	FITTING, ELBOW (3/4" MPT x #08 JIC)
4	810308	4	FITTING, TEE (1/4" NPT x #04 JIC x #04 JIC)
5	810310	6	FITTING, ELBOW (1/2" MPT x #04 JIC)
6	810204	(REF.)	VALVE ASSEMBLY, FRONT; VALVE w/FITTINGS
7	810210	(REF.)	VALVE ASSEMBLY, REAR; VALVE w/FITTINGS
8	810214	(REF.)	VALVE HANDLE, REPLACEMENT; w/LINK KIT
9	810215	(REF.)	VALVE HANDLE, REPLACEMENT; ASSEMBLY
10	810217	(REF.)	VALVE HANDLE, REPLACEMENT; (HANDLE ONLY)

ITEM	PART NO.	QTY	DESCRIPTION
11	810218	(REF.)	VALVE HANDLE, REPLACEMENT; (LINK KIT ONLY)
12	810219	(REF.)	VALVE HANDLE BRACKET, REPLACEMENT;
13	810615	(REF.)	HYD.CYL.HOSES,96" (qty. 4)(#04 w/#04JIC SWIVEL)
14	810630	(REF.)	HYD.CYL.HOSES,38" (qty. 4)(#04 w/#04JIC SWIVEL)
15	810640	(REF.)	HYD.CYL.HOSES,62" (qty. 4)(#04 w/#04JIC SWIVEL)
16	240258	4	#4 MJIC X #3 MORB 90 DEG. ELBOW (6801-04-03-NWO-FG)
17			
18			
19	810205	1	VALVE ASSEMBLY, FRONT, W/ 90deg FITTINGS
20	600603	(REF.)	LOCKING VALVE (DPC1-10-P-6T)
21	600606	(REF.)	LOCKING VALVE W/ FITTINGS

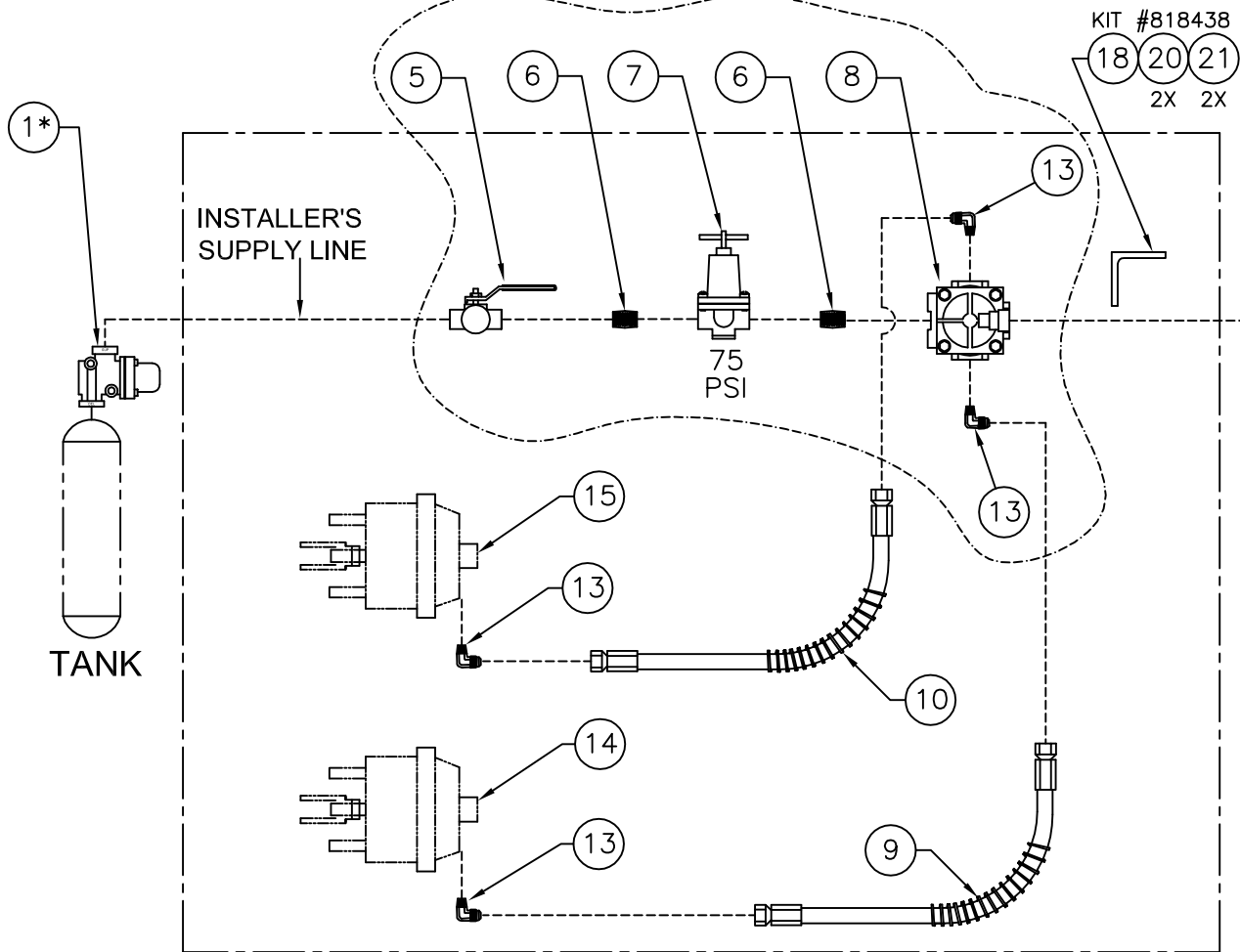
	5/9/11	CORRECTED SECTION REFERENCE	NEH	
	9/20/10	DELETED P/N'S 810311, 810312, & 810313 & ADDED 240258	JBG	
	9/09/09	REVISED SCHEMATIC LAYOUT AND B.O.M. PER AS BUILT NOW	JBG	
	7/30/09	REVISED BY REMOVING TYPE OF VALVES ENERGY/GRESEN	JBG	
REV	DATE	DESCRIPTION	BY	APP

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS		TITLE: VALVE ASSEMBLIES & HYDRAULIC SCHEMATIC			
FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" X ± .003 XX ± .030 XXX OR .XXXX ± .005 DRILL SIZES: ± .005 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES		DIVERSIFIED METAL FABRICATORS, INC.(404)875-1512			
DRAWN BY:  KLC	APPD BY:	DATE:  10/07/98		DRAWING NUMBER:  M1630114	REV:  D

ITEM	PART NO.	QTY	DESCRIPTION
1	818483	1*	VALVE, PRESSURE PROTECTION (BW103976)(SPL PR-4)
2	818484	1	MTG ANGLE BRKT, AIR BRAKE VALVE - OPTIONAL
3	818485	1	VALVE, TOGGLE AIR (VE032037)
4	818486	1	LEGEND PLATE (ON-OFF FOR TOGGLE AIR VALVE)
5	818488	2	VALVE, BRASS BALL (3/8" - PBV500P-6)
6	818498	4	FITTING, NIPPLE (215PN-6)
7	818489	2	REGULATOR, AIR (MIDLAND KN31070)
8	818490	2	VALVE, AIR RELAY (MIDLAND KN28500)
9	818492	1	HOSE, AIR LINE; FRONT LH w/SPRING GUARD (H06906 x 62")
10	818494	1	HOSE, AIR LINE; FRONT RH w/SPRING GUARD (H06906 x 75")
11	818496	2	HOSE, AIR LINE; REAR (H06906 x 59")
12	818497	2	FITTING, STRAIGHT (0104-6-6B SAE)
13	818499	6	FITTING, 90° (2104-6-6B)
14	818458	1	AIR BRAKE CHAMBER, FRONT DRIVER'S SIDE
15	818459	1	AIR BRAKE CHAMBER, FRONT PASSENGER'S SIDE

Note: Items #5, 6, 7, 8,  
& 13 shipped assembled.  
(Front Kit p/n 818413)

FROM VEHICLE AIR BRAKE  
CONTROL CIRCUIT



FRONT AXLE

\*Item #1 p/n 818483 - only qty. 1 included w/ front brakes

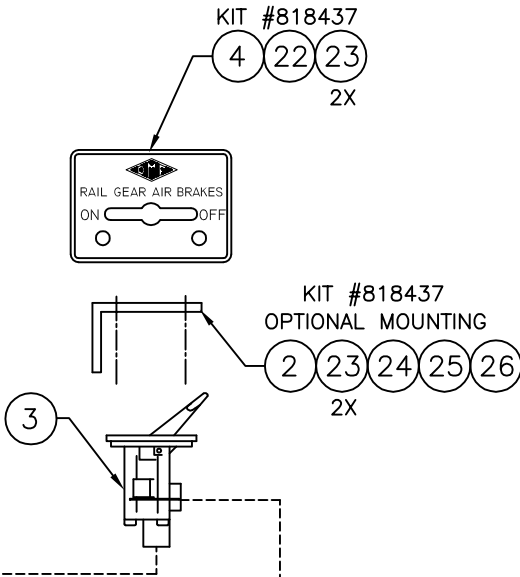
**KIT #818413 (FRONT) INCLUDE ITEMS: #5, #6, #7, #8, & #13**

**KIT #818415 (REAR) INCLUDE ITEMS: #5, #6, #7, #8, & #13**

**KIT #818437 INCLUDE ITEMS: #2, #3, #4, #22, #23, #24, #25, & #26**

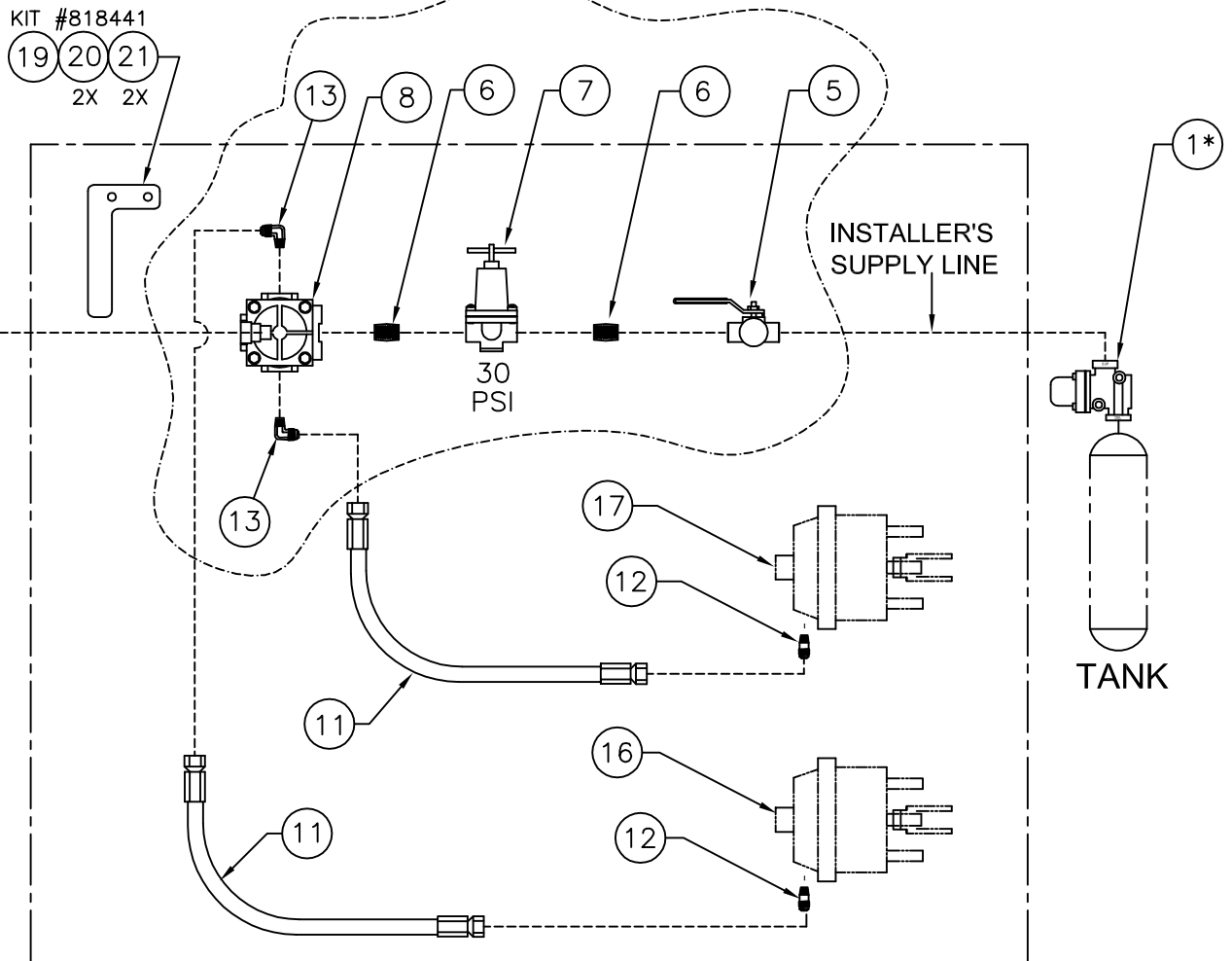
**KIT #818438 INCLUDE ITEMS: #18, #20 (2x), & #21 (2x)**

**KIT #818441 INCLUDE ITEMS: #19, #20 (2x), & #21 (2x)**







ITEM	PART NO.	QTY	DESCRIPTION
16	818460	1	AIR BRAKE CHAMBER, REAR DRIVER'S SIDE
17	818461	1	AIR BRAKE CHAMBER, REAR PASSENGER'S SIDE
18	818491	1	VALVE MOUNT BRKT, FRONT AIR BRAKE
19	818493	1	VALVE MOUNT BRKT, REAR AIR BRAKE
20	818421	4	HEX HEAD 5/16-18 X 1-1/4"
21	20342	4	5/16-18 NYLON LOCK NUT
22	818424	2	ROUND HEAD MACHINE SCREW #10-24 X 3/4"
23	818425	4	#10 LOCK WASHER (LW#10)
24	605101	2	#10 FLAT WASHER
25	605028	2	#10-24 HEX NUT
26	818887	2	RD HEAD MACHINE SCREW #10-24 X 1.00"

Note: Items #5, 6, 7, 8,  
& 13 shipped assembled.  
(Rear Kit p/n 818415)



INCLUDED WITH REAR AXLE KIT ONLY

	7/17/13	CORRECTED HARDWARE PART #'S	BJF	
	8/19/09	REVISED ITEM #1 TO QTY. 1 AND ADDED NOTES	JBG	
	11/28/94	ADDED TANKS	MSM	
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX OR .XXXX ± .005 DRILL SIZES: + .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES < 0.030 X 45° MAX				
		TITLE:  COBRA AIR BRAKE CONTROL SYSTEM ASSEMBLY  DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512		
DRAWN BY: TSH		APPD BY:	DATE: 05/17/92	
			DRAWING NUMBER: 818400	REV: C